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ABSTRACT

The technology of the automatic information processing field has progressed dramatically in the past few years and has created a problem in common term usage. As a solution, "Datamation" Magazine offers this glossary which was compiled by the U.S. Bureau of the Budget as an official reference. The terms appear in a single alphabetic sequence, ignoring commas or hyphens. Definitions are given only under "key word" entries. Modifiers consisting of more than one word are listed in the normally used sequence (record, fixed length). In cases where two or more terms have the same meaning, only the preferred term is defined, all synonymous terms are given at the end of the definition. Other relationships between terms are shown by descriptive referencing expressions. Hyphens are used sparingly to avoid ambiguity. The derivation of an acronym is shown by underscoring the appropriate letters in the words from which the acronym is formed. Although this glossary is several years old, it is still considered the best one available. (NH)

DATAMATION

automatic
data
processing

GLOSSARY

DATAMATION Magazine reprints this Glossary of Terms as a service to the data processing field. As with any new and dynamic field, standardization and common terminology are generally afterthoughts.

The technology of the automatic information processing field has progressed dramatically in the past few years and now is the time that we should address ourselves to the problem of common terms. Towards this end we offer this glossary, which was compiled by the U. S. Bureau of the Budget as an official reference. Although several years old, it is to our knowledge the best glossary available.

It is our hope that this will contribute to a greater interchange of information and standardization within this vastly expanding field.

Gardner Landon

GARDNER F. LANDON
Publisher

A GUIDE TO USERS

1. Typography and General Format.

Terms in this glossary appear in a single alphabetic sequence, ignoring commas or hyphens. Lower case, bold characters are used for terms, except acronyms and the initial letters of proper nouns, for which capital, bold letters are used. Lighter face characters are used for definitions and for cross referencing or clarifying terms.

2. Key Words and Modifiers.

Definitions are given only under key word entries. Such entries may be either single word or multiple word terms, and may be nouns or other parts of speech. For example:

address	(noun)
address, direct	(noun, multiple term)
algorithmic	(adjective)
assemble	(verb)
auto-abstract	(noun; verb)

Modifiers consisting of more than one word are listed in spoken or normally used sequence. For example:

program, internally stored
record, fixed length

3. Preferred Terminology.

When two or more terms have the same meaning, definitions are given only under the preferred term. The phrase, "same as ..." is used to indicate the term under which the definition appears. For example:

quantizer, same as (digitizer).

All synonymous terms are given at the end of the definition. For example:

digitizer, a device which converts an analog measurement into digital form, Synonymous with (quantizer).

4. Cross Referencing.

Other relationships between terms are shown by descriptive referencing expressions. The following are examples; similar to, contrasted with, and clarified by.

The expression "see ...", is used only with terms appearing in an inverted word order, and serves to lead the user to the term where the definition appears.

5. Use of Hyphens.

Hyphens have been used sparingly, and chiefly to avoid ambiguity. For example, in the term "data-reduction", the hyphen indicates that the term is a single concept and does not appear in the inverted word form.

6. Acronyms.

The derivation of an acronym is shown by underscoring the appropriate letters in the words from which the acronym is formed. For example: COBOL, Common Business Oriented Language.

absolute address, see (address, absolute).
absolute code, see (code, absolute).
absolute error, see (error, absolute).
absolute value computer, see (computer, absolute value).
a. c. dump, see (dump, a. c.).
acceleration time, see (time, acceleration).
access, immediate, pertaining to the ability to obtain data from or place data in a storage device, or register directly without serial delay due to other units of data, and usually in a relatively short period of time.
access, parallel, the process of obtaining information from or placing information into storage where the time required for such access is dependent on the simultaneous transfer of all elements of a word from a given storage location. Synonymous with (simultaneous access).
access, random, (1) pertaining to the process of obtaining information from or placing information into storage where the time required for such access is independent of the location of the information most recently obtained or placed in storage; (2) pertaining to a device in which random access, as defined in definition 1, can be achieved without effective penalty in time.
access, serial, pertaining to the process of obtaining information from or placing information into storage where the time required for such access is dependent on the necessity for waiting while nondesired storage locations are processed in turn.
access, simultaneous, same as (access, parallel).
access, time, see (time, access).
accounting machine, same as (tabulator).
accumulator, (1) the register and associated equipment in the arithmetic unit of the computer in which arithmetical and logical operations are performed. (2) A unit in a digital computer where numbers are totaled; i.e., accumulated. Often the accumulator stores one operand and upon receipt of any second operand, it forms and stores the result of performing the indicated operation on the first and second operands. Related to (adder).
accuracy, the degree of exactness of an approximation or measurement. High accuracy thus implies low error. Accuracy normally denotes absolute quality of computed results; precision usually refers to the amount of detail used in representing those results. Thus, four place results are less precise than six place results; nevertheless a four place table might be more accurate than an erroneously computed six place table.
acoustic delay line, see (line, acoustic delay).
action, rate, a type of control action in which the rate of correction is made proportional to how fast the condition is going awry. This is also called derivative action.
add subtract time, see (time, add subtract).
adder, a device which forms, as output, the sum of two, or more numbers presented as inputs. Often no data retention feature is included; i.e., the output signal remains only as long as the input signals are present. Related to (accumulator) (2).
address, (1) an identification, represented by a name, label or number, for a register or location in storage. Addresses are also a part of an instruction word along with commands, tags, and other symbols. (2) The part of an instruction which specifies an operand for the instruction.
address, absolute, an address which indicates the exact storage location where the referenced operand is to be found or stored in the actual machine code address numbering system. Synonymous with (specific address) and related to (code, absolute).
address, base, (1) a number which appears as an address in a computer instruction, but which serves as the base, index, initial or starting point for subsequent addresses to be modified. Synonymous with (presumptive address) and (reference address). (2) A number used in symbolic coding in conjunction with a relative address.
address, direct, an address which indicates the location where the referenced operand is to be found or stored with no reference to an index register or B-Box. Synonymous with (first level address).
address, effective, (1) a modified address. (2) The address actually considered to be used in a particular execution of a computer instruction.
address, first level, same as (address, direct).
address, floating, formerly, an address written in such a way that it can easily be converted to a machine address by indexing, assembly, or by some other means.
address, four, a method of specifying the location of operands and instructions in which the storage location of the two operands and the storage location of the results of the operation are cited, and the storage location of the next instruction to be executed are cited.
address, immediate, an instruction address in which the address part of the instruction is the operand. Synonymous with (zero level address).
address, indexed, an address that is to be modified or has been modified by an index register or similar device. Synonymous with (variable address).
address, indirect, an address in a computer instruction which indicates a location where the address of the referenced operand is to be found. In some computers the machine address indicated can itself be indirect. Such multiple levels of addressing are terminated either by prior control or by a termination symbol. Synonymous with (second level address).
address, machine, an absolute, direct, unindexed address expressed as such, or resulting after indexing and other processing has been completed.
address, multi, same as (address, multiple).
address, multiple, a type of instruction which specifies the addresses of two or more items which may be the addresses of locations of inputs or outputs of the calculating unit or the addresses of locations of instructions

for the control unit. The term multi-address is also used in characterizing computers; e.g., two, three, or four address machines. Synonymous with (multi-address).

address, one, (1) a single address. (2) A system of machine instruction such that each complete instruction explicitly describes one operation and involves one storage location. Synonymous with (single address) and related to (instruction, one address).

address, one plus one, an instruction system having the property that each complete instruction includes an operation and two addresses, one for the location of a register in the storage containing the item to be operated upon, and one for the location containing the next instruction.

address part, the part of an instruction word that defines the address of a register or location.

address, presumptive, same as (address, base) (1).

address, reference, same as (address, base) (1).

address, relative, an address to which the base address must be added in order to find the machine address.

address, second level, same as (address, indirect).

address, single, same as (address, one) (2).

address, specific, same as (address, absolute).

address, symbolic, a label, alphabetic or alphameric, used to specify a storage location in the context of a particular program. Often, programs are first written using symbolic addresses in some convenient code, which are translated into absolute addresses by an assembly program.

address, three, a method of specifying the location of operands and instructions in which the storage location of the two operands and the storage location of the results of the operations are cited; e.g., addend, augend, and sum addresses all specified in one instruction word.

address, three plus one, a method of specifying the location of operands and instructions in which the storage location of the two operands and the storage location of the results of the operations are cited and in which the location or address of the next instruction to be executed is also to be specified.

address, variable, same as (address, indexed).

address, zero level, same as (address, immediate).

addressing system, see (system, addressing).

ADP, (Automatic Data Processing), see (processing, automatic data).

advance, item, a technique in the grouping of records for operating successively on different records in storage.

algebra, boolean, a process of reasoning, or a deductive system of theorems using a symbolic logic, and dealing with classes, propositions, or on-off circuit elements. It employs symbols to represent operators such as AND, OR, NOT, EXCEPT, IF...THEN, etc., to permit mathematical calculation. Named after George Boole, famous English mathematician (1815-1864).

ALGOL, (ALGOrithmic Language), see (language, algorithmic).

algorithm translation, see (translation, algorithm).

algorithmic, pertaining to a constructive calculating process usually assumed to lead to the solution of a problem in a finite number of steps.

algorithmic language, see (language, algorithmic).

allocation, storage, the process of reserving blocks of storage to specified blocks of information.

alphabet, a specific kind of character set excluding numerals; i.e., the character set most frequently used in a natural language. Clarified by (set, character).

alphabetic code, see (code, alphabetic).

alphabetic-numeric, the characters which include letters of the alphabet, numerals, and other symbols such as punctuation or mathematical symbols.

alphameric, a contraction of alphanumeric and alphabetic-numeric.

alphanumeric, a contraction of alphabetic-numeric.

alphanumeric instruction, see (instruction, alphanumeric).

ALU, (Arithmetic) and (Logical Unit), see (unit, arithmetic).

analog, the representation of numerical quantities by means of physical variables; e.g., translation, rotation, voltage, or resistance. Contrasted with (digital).

analog computer, see (computer, analog).

analog device, see (device, analog).

analog network, see (network, analog).

analog representation, see (representation, analog).

analysis, numerical, the study of methods of obtaining useful quantitative solutions to mathematical problems, regardless of whether an analytic solution exists or not, and the study of the errors and bounds on errors in obtaining such solutions.

analysis, systems, the examination of an activity, procedure, method, technique, or a business to determine what must be accomplished and how the necessary operations may best be accomplished.

analyst, a person skilled in the definition of and the development of techniques for the solving of a problem; especially those techniques for solutions on a computer.

analytic relationship, see (relationship, analytic).

analyzer, a computer routine whose purpose is to analyze a program written for the same or a different computer. This analysis may consist of summarizing instruction references to storage and tracing sequences of jumps.

analyzer, differential, a computer (usually analog) designed and used primarily for solving many types of differential equations.

analyzer, digital differential, an incremental differential analyzer, usually electronic. Synonymous with DDA.

analyzer, electronic differential, a form of analog computer using interconnected

electronic integrators to solve differential equations.

analyzer, mechanical differential, a form of analog computer using interconnected mechanical surfaces to solve differential equations; e.g., the Bush differential analyzer developed by Vannevar Bush at M.I.T. which used differential gear boxes to perform addition and a combination of wheel disk spherical mechanisms to perform integration.

analyzer, network, an analog device designed primarily for simulating electrical networks. Synonymous with (network calculator).

and, same as (operator, and).

and circuit, same as (gate, and).

and gate, see (gate, and).

and operator, see (operator, and).

application, the system or problem to which a computer is applied. Reference is often made to an application as being either of the computational type, wherein arithmetic computations predominate, or of the data processing type, wherein data handling operations predominate.

application, standby, an application in which two or more computers are tied together as a part of a single over-all system and which, as in the case of an inquiry application, stand ready for immediate activation and appropriate action.

application study, see (study, application).

area, constant, a part of storage designated to store the invariable quantities required for processing.

area, input, same as (block, input) (1).

area, instruction, (1) a part of storage allocated to receive and store the group of instructions to be executed; (2) the storage locations used to store the program.

area, output, same as (block, output) (2).

argument, (1) an independent variable; e.g., in looking up quantity in a table, the number or any of the numbers which identifies the location of the desired value; or in a mathematical function the variable which when a certain value is substituted for it the value of the function is determined. (2) An operand in an operation on one or more variables.

arithmetic check, same as (check, mathematical).

arithmetic, fixed point, (1) a method of calculation in which operations take place in an invariant manner, and in which the computer does not consider the location of the radix point. This is illustrated by desk calculators or slide rules, with which the operator must keep track of the decimal point. Similarly with many automatic computers, in which the location of the radix point is the programer's responsibility. Contrasted with (arithmetic, floating point). (2) A type of arithmetic in which the operands and results of all arithmetic operations must be properly scaled so as to have a magnitude between certain fixed values.

arithmetic, floating decimal, same as (arithmetic, floating point).

arithmetic, floating point, a method of calculation which automatically accounts for the location of the radix point. This is usually accomplished by handling the number as a signed mantissa times the radix raised to an integral exponent; e.g., the decimal number +88.3 might be written as $+.883 \times 10^2$; the binary number -.0011 as $-.11 \times 2^{-2}$. Synonymous with (floating decimal arithmetic) and contrasted with (arithmetic, fixed point) (1).

arithmetic, internal, the computations performed by the arithmetic unit of a computer.

arithmetic, multi precision, a form of arithmetic similar to double precision arithmetic except that two or more words may be used to represent each number.

arithmetic section, same as (unit, arithmetic).

arithmetic shift, see (shift, arithmetic).

arithmetic unit, see (unit, arithmetic).

arithmetic operation, see (operation, arithmetic).

artificial intelligence, see (intelligence, artificial).

array, a series of items arranged in a meaningful pattern.

artificial language, see (language, artificial).

aspect card, see (card, aspect).

assemble, (1) to integrate subroutines that are supplied, selected, or generated into the main routine, by means of preset parameters, by adapting, or changing relative and symbolic addresses to absolute form, or by placing them in storage; (2) to operate, or perform the functions of an assembler.

assembler, a computer program which operates on symbolic input data to produce from such data machine instructions by carrying out such functions as: translation of symbolic operation codes into computer operating instructions; assigning locations in storage for successive instructions; or computation of absolute addresses from symbolic addresses. An assembler generally translates input symbolic codes into machine instructions item for item, and produces as output the same number of instructions or constants which were defined in the input symbolic codes. Synonymous with (assembly routine); (assembly program) and related to (compiler).

assembly list, see (list, assembly).

assembly program, same as (assembler).

assembly routine, same as (assembler).

assembly unit, see (unit, assembly).

asynchronous, pertaining to a lack of time coincidence in a set of repeated events where this term is applied to a computer to indicate that the execution of one operation is dependent on a signal that the previous operation is completed.

asynchronous computer, see (computer, asynchronous).

attenuation, signal, the reduction in the strength of electrical signals.

audit, trail, a system of providing a means for tracing items of data from processing step to step, particularly from a machine produced report or other machine output back to the original source data.

auto-abstract, (1) a collection of words selected from a document, arranged in a meaningful order, commonly by an automatic or machine method; (2) to select an assemblage of key

words from a document, commonly by an automatic or machine method.

automatic check, see (check, automatic).

automatic code, see (code, automatic).

automatic computer, see (computer, automatic).

automatic data processing, see (processing, automatic data).

automatic data processing equipment, see (equipment, automatic data processing).

automatic data processing system, see (system, automatic data processing).

automatic dictionary, see (dictionary, automatic).

automatic error correction, see (correction, automatic error).

automatic feed punch, see (punch, automatic feed).

automatic programing, see (programing, automatic).

automatic routine, see (routine, automatic).

automatic stop, see (stop, automatic).

automation, (1) the implementation of processes by automatic means; (2) the theory, art, or technique of making a process more automatic; (3) the investigation, design, development, and application of methods of rendering processes automatic, self-moving, or self-controlling.

automation, source data, the many methods of recording information in coded forms on paper tapes, punched cards, or tags that can be used over and over again to produce many other records without rewriting. Synonymous with SDA.

automonitor, to make an electronic computer prepare a record of its own data processing operations, or a program or routine for this purpose.

auxiliary equipment, same as (equipment, off line).

auxiliary routine, see (routine, auxiliary).

auxiliary storage, see (storage, auxiliary).

available machine time, same as (time, available) (2).

available time, see (time, available).

average effectiveness level, see (level, average effectiveness).

B

balanced error (range of), see (error, balanced) (range of).

band, (1) the gamut or range of frequencies; (2) the frequency spectrum between two defined limits; (3) the frequencies which are within two definite limits and are used for a different purpose; (4) a group of channels. Same as (channel) (3).

band, dead, a specific range of values in which the incoming signal can be altered without also changing the outgoing response. Synonymous with (dead space), (dead zone), and (switching blank) and similar to (zone, neutral).

band, proportional, the range of values of a condition being regulated which will cause the controller to operate over its full range. Usually expressed by engineers in terms of percentage of instrument full scale range.

bandwidth, (1) a group of consecutive frequencies constituting a band which exists between limits of stated frequency attenuation. A band is normally defined as more than 3.0 decibels greater than the mean attenuation across the band. (2) A group of consecutive frequencies constituting a band which exists between limits of stated frequency delay.

base, same as (radix).

base address, see (address, base).

base notation, same as (notation, radix).

base number, same as (radix).

batch processing, see (processing, batch).

batch total, see (total, batch).

batten system, same as (system, peek-a-boo).

baud, (1) a unit of signalling speed equal to the number of code elements per second; (2) the unit of signalling speed equal to twice the number of Morse code dots continuously sent per second. Clarified by (rate, bit) and (capacity, channel).

b-box, same as (register, index).

benchmark problem, see (problem, benchmark).

bias, (1) an unbalanced range of error; i.e., having an average error that is not zero. (2) The average D.C. voltage maintained between certain elements of a circuit, such as between the cathode and the control grid of a vacuum tube.

binary, a characteristic, property, or condition in which there are but two possible alternatives; e.g., the binary number system using 2 as its base and using only the digits zero (0) and one (1). Related to (decimal, binary coded) and clarified by (systems, number).

binary cell, see (cell, binary).

binary code, see (code, binary).

binary coded character, see (character, binary coded).

binary coded decimal, see (decimal, binary coded).

binary coded decimal notation, see (notation, binary coded decimal).

binary coded decimal number, see (number, binary coded decimal).

binary counter, see (counter, binary).

binary digit, see (digit, binary).

binary notation, see (notation, binary).

binary number, see (number, binary).

binary number system, same as (system, number) (2).

binary point, see (point, binary).

binary search, see (search, binary).

binary signalling, see (signalling, binary).

binary to decimal conversion, see (conversion, binary to decimal).

binary variable, same as (variable, two valued).

bionics, the application of knowledge gained from the analysis of living systems to the creation of hardware that will perform functions in a manner analogous to the more sophisticated functions of the living system.

biquinary code, see (code, biquinary).

biquinary coded decimal number, biquinary notation, see (notation, biquinary).

biquinary number, see (number, biquinary).

bi-stable, the capability of assuming either of two stable states, hence of storing one bit of information.

BIT, (1) an abbreviation of binary digit. (2) A single character in a binary number. (3) A single pulse in a group of pulses. (4) A unit of information capacity of a storage device. The capacity in bits is the logarithm to the base two of the number of possible states of the device. Related to (capacity, storage).

bit. check, a binary check digit; often a parity bit. Related to (check, parity) and (number, self checking).

bit location, see (location, bit).

bit, parity, a check bit that indicates whether the total number of binary "1" digits in a character or word (excluding the parity bit) is odd or even. If a "1" parity bit indicates an odd number of "1" digits, then a "0" bit indicates an even number of them. If the total number of "1" bits, including the parity bit, is always even, the system is called an even parity system. In an odd parity system, the total number of "1" bits, including the parity bit, is always odd.

bit rate, see (rate, bit).

bit, sign, a binary digit used as a sign draft.

bit, zone, (1) one of the two left most bits in a commonly used system in which six bits are used for each character. Related to (over-punch). (2) Any bit in a group of bit positions that are used to indicate a specific class of items; e.g., numbers, letters, special signs, and commands.

blank, (1) a regimented place of storage where data may be stored; e.g., a location in a storage medium. Synonymous with (space). (2) A character used to indicate an output space on a printer in which nothing is printed.

blank, switching, same as (band, dead).

block, (1) a group of computer words considered as a unit of virtue of their being stored in successive storage locations. (2) The set of locations or tape positions in which a block of words, as defined above, is stored or recorded. (3) A circuit assemblage which functions as a unit; e.g., a circuit building block of standard design, and the logic block in a sequential circuit.

block diagram, see (diagram, block).

block, input, (1) a section of internal storage of a computer reserved for the receiving and processing of input information. Synonymous with (input area). (2) An input buffer. (3) A block of computer words considered as a unit and intended or destined to be transfered from an external source or storage medium to the internal storage of the computer.

block length, see (length, block).

block, output, (1) a block of computer words considered as a unit and intended or destined to be transferred from an internal storage medium to an external destination. (2) A section of internal storage reserved for storing data which are to be transferred out of the computer. Synonymous with (output area). (3) A block used as an output buffer.

block sort, see (sort, block).

block, standby, locations always set aside in storage for communication with buffers in order to make more efficient use of such buffers.

block transfer, see (transfer, block).

blockette, a subdivision of a group of consecutive machine words transferred as a unit, particularly with reference to input and output.

blocking, the combining of two or more records into one block.

bookkeeping operation, see (operation, bookkeeping).

boolean algebra, see (algebra, boolean).

bootstrap, a technique for loading the first few instructions of a routine into storage; then using these instructions to bring in the rest of the routine. This usually involves either the entering of a few instructions manually or the use of a special key on the console.

borrow, an arithmetically negative carry. It occurs in direct subtraction by raising the low order digit of the minuend by one unit of the next higher order digit; e.g., when subtracting 67 from 92, a tens digit is borrowed from the 9, to raise the 2 to a factor of 12; the 7 of 67 is then subtracted from the 12 to yield 5 as the units digit of the difference; the 6 is then subtracted from 8, or 9-1, yielding 2 as the tens digit of the difference. Related to (carry) (3).

box, B, same as (register, index).

box, decision, the symbol used in flow charting to indicate a choice or branching in the information processing path.

branch, the selection of one or two or more possible paths in the flow of control based on some criterion. The instructions which mechanize this concept are sometimes called branch instructions; however the terms transfer of control and jump are more widely used. Related to (transfer, conditional).

branch instruction, see (instruction, branch).

branch, conditional, same as (transfer, conditional).

branch, unconditional, same as (transfer, unconditional).

branchpoint, a point in a routine where one of two or more choices is selected under control of the routine.

breakpoint, a point in a computer program at which conditional interruption, to permit visual check, printing out, or other analyzing, may occur. Breakpoints are usually used in debugging operations.

breakpoint instruction, see (instruction, breakpoint).

breakpoint switch, see (switch, breakpoint).

breakpoint symbol, see (symbol, breakpoint).

B-register, (1) same as (register, index); (2) a register used as an extension of the accumulator during multiply and divide processes.

broadband noise, see (noise, broadband).

brush, an electrical conductor for reading data from a punch card.

bucket, a slang expression used to indicate some portion of storage specifically reserved for accumulating data, or totals; e.g., "throw it in bucket #1." is a possible expression. Commonly used in initial planning.

buffer, (1) an internal portion of a data processing system serving as intermediary storage between two storage or data handling systems with different access times or

formats; usually to connect an input or output device with the main or internal high-speed storage. Clarified by (storage, buffer (4). (2) A logical OR circuit. (3) An isolating component designed to eliminate the reaction of a driven circuit on the circuits driving it; e.g., a buffer amplifier. (4) A diode.

buffer storage, see (storage, buffer).

buffered computer, see (computer, buffered).

bug. a mistake in the design of a routine or a computer, or a malfunction.

built in check, same as (check, automatic).

built in automatic check, same as (check, automatic).

bus, (1) a circuit over which data or power is transmitted. Often one which acts as a common connection among a number of locations. Synonymous with (trunk). (2) A communications path between two switching points.

byte, (1) A generic term to indicate a measurable portion of consecutive binary digits; e.g., an 8-bit or 6-bit byte. (2) A group of binary digits usually operated upon as a unit.

C

calculation, fixed point, a calculation made with fixed point arithmetic.

calculation, floating point, a calculation made with floating point arithmetic.

calculator, (1) a device that performs primarily arithmetic operations based upon data and instructions inserted manually or contained on punch cards. It is sometimes used interchangeably with computer. (2) A computer.

calculator, network, same as (analyzer, network).

call in, to transfer control of a digital computer temporarily from a main routine to a subroutine, which is inserted in the sequence of calculating operations to fulfill a subsidiary purpose.

call number, see (number, call).

calling sequence, see (sequence, calling).

capacity, channel, (1) the maximum number of binary digits or elementary digits to other bases which can be handled in a particular channel per unit time. (2) The maximum possible information transmission rate through a channel at a specified error rate. The channel capacity may be measured in bits per second or bauds. Clarified by (rate, bit) and (baud).

capacity, circuit, the number of communications channels which can be handled by a given circuit at the same time.

capacity, memory, same as (capacity, storage).

capacity, storage, the number of elementary pieces of data that can be contained in a storage device. Frequently defined in terms of characters in a particular code or words of a fixed size that can be so contained. Synonymous with (memory capacity) and related to (bit) (4).

card, aspect, a card on which is entered the accession numbers of documents in an information retrieval system. The documents are judged to be related in an important fashion to the concept for which the card is established. Related to (system, peek-a-boo; system, uniterm; docuterm; and uniterm).

card, control, a card which contains input data or parameters for a specific application of a general routine.

card, edge notched, a card of any size provided with a series of holes on one or more edges for use in coding information for a simple mechanical search technique. Each hole position may be coded to represent an item of information by notching away the edge of the card into the hole. Cards containing desired information may then be mechanically selected from a deck by inserting a long needle in a hole position and lifting the deck to allow the notched cards to fall from the needle. Unwanted cards remain in the deck.

card, edge punched, a card of fixed size into which information may be recorded or stored by punching holes along one edge in a pattern similar to that used for punch tape. Hole positions are arranged to form coded patterns in 5, 6, 7, or 8 channels and usually represent data by a binary coded decimal system.

card, eighty (80) column, a punch card with 80 vertical columns representing 80 characters. Each column is divided into two sections, one with character positions labeled zero through nine, and the other labeled eleven (11) and twelve (12). The 11 and 12 positions are also referred to as the X and Y zone punches, respectively. Related to (card, punch) and (card, ninety column).

card feed, see (feed, card).

card field, see (field, card).

card image, see (image, card).

card jam, see (jam, card).

card, master, a card containing fixed or indicative information for a group of cards. It is usually the first card of that group.

card, ninety (90) column, a punch card with 90 vertical columns representing 90 characters. The columns are divided in half horizontally, such that the vertical columns in the upper half of the card are numbered 1 through 45, and those in the lower half 46 through 90. Six punching positions may be used in each column; these are designated, from top to bottom, to represent the digits 0, 1, 3, 5, 7, and 9 by a single punch. The digits 2, 4, 6, and 8 and other characters may be represented by a combination of two or more punches. Related to (card, punch) and card, eighty column).

card-programed, (1) the capability of being programed by punch cards, (2) the capability of performing sequences of calculating operations according to instructions contained in a stack of punch cards.

card, punch, a heavy stiff paper of constant size and shape, suitable for punching in a pattern that has meaning, and for being handled mechanically. The punched holes are sensed electrically by wire brushes, mechanically by metal fingers, or photoelectrically by photocells. Related to (card, eighty column) and (card, ninety column).

card punch unit, same as (punch, card).

card reader, see (reader, card).

card reader unit, same as (reader, card) (2).

card reproducer, see (reproducer, card).
card stacker, see (stacker, card).
card to tape converter, see (converter, card to tape).
card, transfer, same as (card, transition).
card, transfer of control, same as (card, transition).
card, transition, a card used in the loading of a deck of program cards, which causes the termination of loading and initiates the execution of the program. Synonymous with (transfer of control card and transfer card).
carrier wave, see (wave, carrier).
carry, (1) a signal, or expression, produced as a result of an arithmetic operation on one digit place of two or more numbers expressed in positional notation and transferred to the next higher place for processing there. (2) A signal or expression as defined in (1) above which arises in adding, when the sum of two digits in the same digit place equals or exceeds the base of the number system in use. If a carry into a digit place will result in a carry out of the same digit place, and if the normal adding circuit is bypassed when generating this new carry, it is called a high speed carry, or standing on nines carry. If the normal adding circuit is used in such a case, the carry is called a cascaded carry. If a carry resulting from the addition of carries is not allowed to propagate; e.g., when forming the partial product in one step of a multiplication process, the process is called a partial carry. If it is allowed to propagate, the process is called a complete carry. If a carry generated in the most significant digit place is sent directly to the least significant place; e.g., when adding two negative numbers using nine complements, that carry is called an end around carry. Synonymous with (cascaded carry; complete carry; end around carry; high-speed carry; and partial carry). (3) A signal or expression in direct subtraction, as defined in (1) above which arises when the difference between the digits is less than zero. Such a carry is frequently called a borrow. Related to (borrow). (4) The action of forwarding a carry. (5) The command directing a carry to be forwarded.
carry, cascaded, same as (carry) (2).
carry, complete, same as (carry) (2).
carry-complete signal, see (signal, carry-complete).
carry, end around, same as (carry) (2).
carry, high-speed, same as (carry) (2).
carry, partial, same as (carry) (2).
carry, standing on nines, a carry out of a digit position generated by a carry into the digit position and the normal adding circuit is bypassed.
carry time, see (time, carry).
cascade control, see (control, cascade).
cascaded carry, same as (carry) (2).
cathode-follower, a vacuum-tube circuit in which the input signal is applied to the control grid and the output is taken from the cathode. Electrically, such a circuit possesses high input impedance and low output impedance characteristics. The equivalent circuit using a transistor is called an emitter follower.
cathode ray tube, see (tube, cathode ray).
cell, (1) the storage for one unit of information, usually one character or one word. (2) A location specified by whole or part of the address and possessed of the faculty of store. Specific terms such as column, field, location, and block, are preferable when appropriate.
cell, binary, (1) a cell of one binary digit capacity, (2) a one bit register or bit position.
center, data processing, a computer installation providing data processing service for others, sometimes called customers, on a reimbursable or non-reimbursable basis.
central processing unit, same as (frame, main) (1).
centralized data processing, see (processing, centralized data).
chad, a small piece of paper tape or punch card removed when punching a hole to represent information.
chaded paper tape, see (tape, chaded paper).
chadless, a type of punching of paper tape in which each chad is left fastened by about a quarter of the circumference of the hole, at the leading edge. This mode of punching is useful where it is undesirable to destroy information written or printed on the punched tape or it is undesirable to produce chads. Chadless punched paper tape must be sensed by mechanical fingers, for the presence of chad in the tape would interfere with reliable electrical or photoelectric reading of the paper tape.
chadless paper tape, see (tape, chadless paper).
chain, (1) any series of items linked together; (2) pertaining to a routine consisting of segments which are run through the computer in tandem, only one being within the computer at any one time and each using the output from the previous program as its input.
change dump, see (dump, change).
change tape, see (tape, change).
change, step, the change from one value to another in a single increment in negligible time.
channel, (1) a path along which information, particularly a series of digits or characters, may flow. (2) One or more parallel tracks treated as a unit. (3) In a circulating storage, a channel is one recirculating path containing a fixed number of words stored serially by word. Synonymous with (band). (4) A path for electrical communication. (5) A band of frequencies used for communication.
channel capacity, see (capacity, channel).
channel reliability, see (reliability, channel).
character, (1) one symbol of a set of elementary symbols such as those corresponding to the keys on a typewriter. The symbols usually include the decimal digits 0 through 9, the letters A through Z, punctuation marks, operation symbols, and any other single symbols which a computer may read, store, or write. (2) The electrical, magnetic, or mechanical profile used to represent a

character in a computer, and its various storage and peripheral devices. A character may be represented by a group of other elementary marks, such as bits or pulses.

character, binary coded, one element of a notation system representing alphameric character such as deciminal digits, alphabetic letters, and punctuation marks by a predetermined configuration of consecutive binary digits.

character density, see (density, character).

character, illegal, a character or combination of bits which is not accepted as a valid representation by the machine design or by a specific routine. Illegal characters are commonly detected and used as an indication of machine malfunction.

character reader, see (reader, character).

character recognition, see (recognition, character).

character, redundant, a character specifically added to a group of characters to insure conformity with certain rules which can be used to detect computer malfunction.

character set, see (set, character).

characteristic impedance, see (impedance, characteristic).

chart, flow, a graphic representation of the major steps of work in process. The illustrative symbols may represent documents, machines, or actions taken during the process. The area of concentration is on where or who does what rather than how it is to be done. Synonymous with (process chart) and (flow diagram).

chart, logical flow, a detailed solution of the work order in terms of the logic, or built in operations and characteristics, of a specific machine. Concise symbolic notation is used to represent the information and describe the input, output, arithmetic, and logical operations involved. The chart indicates types of operations by use of a standard set of block symbols. A coding process normally follows the logical flow chart.

chart, process, same as (chart, flow).

check, a process of partial or complete testing of the correctness of machine operations, the existence of certain prescribed conditions within the computer, or the correctness of the results produced by a program. A check of any of these conditions may be made automatically by the equipment or may be programed. Related to (check, marginal).

check, arithmetic, same as (check, mathematical).

check, automatic, a provision constructed in hardware for verifying the accuracy of information transmitted, manipulated, or stored by any unit or device in a computer. Synonymous with (built in check; built in automatic check; hardward check); and related to (check, program) (2).

check bit, see (bit, check).

check, built in, same as (check, automatic).

check, built in automatic, same as (check, automatic).

check code, see (code, check).

check digit, see (digit, check).

check, dump, a check which usually consists of adding all the digits during dumping, and verifying the sum when retransferring.

check, duplication, a check which requires that the results of two independent performances, either concurrently on duplicate equipment or at different times on the same equipment, of the same operation, be identical.

check, echo, a check of accuracy of transmission in which the information which was transmitted to an output device is returned to the information source and compared with the original information to insure accuracy of output.

check, forbidden combination, a check, usually an automatic check, which tests for the occurrence of a nonpermissible code expression. A self checking code, or error detecting code, uses code expressions such that one or more errors in a code expression produces a forbidden combination. A parity check makes use of a self-checking code employing binary digits in which the total number of 1's, or 0's, in each permissible code expression is always even or always odd. A check may be made either for even parity or odd parity. A redundancy check employs a self-checking code which makes use of redundant digits called check digits. Some of the various names that have been applied to this type of check are: forbidden pulse combination, unused order, improper instruction, unallowable digits, improper command, false code, forbidden digit, non existent code, and unused code.

check, hardware, same as (check, automatic).

check indicator, see (indicator, check).

check indicator instruction, see (instruction, check indicator).

check, marginal, a preventive maintenance procedure in which certain operating conditions are varied about their normal values in order to detect and locate incipient defective units; e.g., supply voltage or frequency may be varied. Synonymous with (test, marginal) and (high-low bias test), and related to (check).

check, mathematical, a check which uses mathematical identities or other properties, occasionally with some degree of discrepancy being acceptable; e.g., checking multiplication by verifying that AxB = BxA. Synonymous with (arithmetic check).

check, modulo N, (1) a check that makes use of a check number that is equal to the remainder of the desired number when divided by N; e.g., in a modulo 4 check, the check number will be 0, 1, 2, or 3 and the remainder of A when divided by 4 must equal the reported check number B; otherwise an equipment malfunction has occurred. (2) A method of verification by congruences; e.g., casting out nines. Related to (number, self checking).

check number, see (number, check).

check, odd-even, same as (check, parity).

check, parity, a summation check in which the binary digits, in a character or word, are added, modulo 2, and the sum checked against a single, previously computed parity digit; i.e., a check which tests whether the number of ones in a word is odd or even. Synonymous with (odd-even check) and related to (check, redundant) and to (check, forbidden combination).

checkpoint. a point in time in a machine run at which processing is momentarily halted to make a magnetic tape record of the condition of all the variables of the machine run such as the position of input and output tapes and a copy of working storage. Checkpoints are used in conjunction with a restart routine to minimize reprocessing time occasioned by functional failures.

check problem, see (problem, check).

check, program, (1) a system of determining the correct program and machine functioning either by running a sample problem with similar programing and a known answer, or by using mathematical or logic checks such as comparing A times B with B times A. (2) A check system built into the program or computers that do not have automatic checking. This check system is normally concerned with programs run on computers which are not self-checking internally. Synonymous with (routine check) and related to (check, automatic).

check, redundant, a check which makes use of redundant characters. Related to (check, parity) and to (check, forbidden combination).

check register, see (register, check).

check, residue, (1) any modulo N check, (2) a check of numerical data or arithmetic operations in which the number A is divided by N and the remainder B accompanies A as a check digit.

check, routine, same as (check, program) (2).

check, selection, a check, usually automatic, to verify that the correct register or other device has been selected in the performance of an instruction.

check, sequence, a data processing operation designed to check the sequence of the items in a file assumed to be already in sequence.

check-sum, the sum used in a summation check.

check, summation, a check in which groups of digits are summed, usually without regard for overflow, and that sum checked against a previously computed sum to verify that no digits have been changed since the last summation.

check, system, a check on the overall performance of the system, usually not made by built-in computer check circuits; e.g., control totals, hash totals, and record counts.

check, transfer, a check which verifies that information is transferred correctly from one place to another. It is usually done by comparing each character with a copy of the same character transferred at a different time or by a different route.

check, twin, a continuous duplication check achieved by duplication of hardware and automatic comparison.

check, validity, a check based upon known limits or upon given information or computer results; e.g., a calendar month will not be numbered greater than 12, and a week does not have more than 168 hours.

chinese binary, same as (code, column-binary).

circuit, (1) a system of conductors and related electrical elements through which electrical current flows, (2) a communications link between two or more points.

circuit capacity, see (capacity, circuit).

circuit, and, same as (gate, and).

circuit-dropout, the momentary interruption of a transmission because of the complete failure of a circuit.

circuit, Eccles-Jordan, same as (flip-flop).

circuit, four-wire, a two-way circuit using two paths so arranged that communication currents are transmitted in one direction only on one path, and in the opposite direction on the other path. The transmission path may or may not employ four wires.

circuit, or, same as (gate, or).

circuit, reliability, see (reliability, circuit).

circular shift, same as (shift, cyclic).

circulating register, see (register, circulating).

circulating storage, see (storage circulating).

clear, to erase the contents of a storage device by replacing the contents with blanks, or zeros. Contrasted with (hold) and clarified by (erase).

clock, (1) a master timing device used to provide the basic sequencing pulses for the operation of a synchronous computer; (2) a register which automatically records the progress of real time, or perhaps some approximation to it, records the number of operations performed, and whose contents are available to a computer program.

clock frequency, see (frequency, clock).

clock rate, see (rate, clock).

clock, real time, a clock which indicates the passage of actual time, in contrast to a fictitious time set up by the computer program; such as, elapsed time in the flight of a missile, wherein a 60-second trajectory is computed in 200 actual milliseconds, or a 0.1 second interval is integrated in 100 actual microseconds.

closed loop, see (loop, closed).

closed routine, see (routine, closed).

closed shop, see (shop, closed).

closed subroutine, see (subroutine, closed).

COBOL, Common Business Oriented Language, see (language, common business oriented).

code, (1) a system of symbols for meaningful communication. Related to (instruction) (1). (2) A system of symbols for representing data or instructions in a computer or a tabulating machine. (3) To translate the program for the solution of a problem on a given computer into a sequence of machine language or psuedo instructions and addresses acceptable to that computer. Related to (encode). (4) A machine language program.

code, absolute, a code using absolute addresses and absolute operation codes; i.e., a code which indicates the exact location where the referenced operand is to be found or stored. Synonymous with (one level code) and (specific code) and related to (address, absolute).

code, alphabetic, a system of alphabetic abbreviations used in preparing information for input into a machine; e.g., Boston, New York, Philadelphia, and Washington may in alphabetical coding be reported as BS, NY, PH, WA. Contrasted with (code, numeric).

code, automatic, a code which allows a machine to translate or convert a symbolic language into a machine language

for automatic machine or computer operations.

code, binary, (1) a coding system in which the encoding of any data is done through the use of bits; i.e., 0 or 1. (2) A code for the ten decimal digits, 0, 1, ..., 9 in which each is represented by its binary, radix 2, equivalent; i.e., straight binary.

code, biquinary, a two part code in which each decimal digit is represented by the sum of the two parts, one of which has the value of decimal zero or five and the other the values zero through four. The abacus and soroban both use biquinary codes. An example follows.

Decimal	Biquinary	Interpretation
0	0 000	0+0
1	0 001	0+1
2	0 010	0+2
3	0 011	0+3
4	0 100	0+4
5	1 000	5+0
6	1 001	5+1
7	1 010	5+2
8	1 011	5+3
9	1 100	5+4

code check, to isolate and remove mistakes from a routine.

code checking time, see (time, code checking).

code, chinese binary, same as (code, column-binary).

code, column-binary, a code used with punch cards in which successive bits are represented by the presence or absence of punches on contiguous positions in successive columns as opposed to rows. Column-binary code is widely used in connection with 36-bit word computers where each group of 3 columns is used to represent a single word. Synonymous with (code, chinese binary).

code, computer, (1) a system of combinations of binary digits used by a given computer. Synonymous with (machine code). (2) A repertoire of instructions.

code, cyclic, same as (code, gray).

code, dictionary, an alphabetical arrangement of English words and terms, associated with their code representations. Related to (dictionary, reverse code).

code, direct, a code which specifies the use of actual computer command and address configurations.

code-element, the elemental unit from which a code is constructed; e.g., Baudot code is a binary representation of the alphabet and numerals in which a grouping, presence or absence, of five elements expresses the code information.

code, error correcting, an error detecting code in which the forbidden pulse combination produced by gain or loss of a bit indicates which bit is wrong.

code, error detecting, a code in which errors produce forbidden combinations. A single error detecting code produces a forbidden combination if a digit gains or loses a single bit. A double error detecting code produces a forbidden combination if a digit gains or loses either one or two bits and so forth. Synonymous with (code, self checking) and related to (number, self checking).

code, excess-three, a binary coded decimal code in which each digit is represented by the binary equivalent of that number plus three, for example:

Decimal Digit	XS 3 Code	Binary Value
0	0011	3
1	0100	4
2	0101	5
3	0110	6
4	0111	7
5	1000	8
6	1001	9
7	1010	10
8	1011	11
9	1100	12

code, gray, a binary code in which sequential numbers are represented by expressions which are the same except in one place and in that place differ by one unit; e.g.,

Decimal	Binary	Gray
0	000	000
1	001	001
2	010	011
3	011	010
4	100	110
5	101	111

thus in going from one decimal digit to the next sequential digit, only one binary digit changes its value. Synonymous with (cyclic code).

code, instruction, the list of symbols, names and definitions of the instructions which are intelligible to a given computer or computing system.

code, interpretive, same as (routine, interpretive).

code line, a single instruction written usually on one line, in a code for a specific computer to solve a problem. This instruction is usually stored as a whole in the program register of the computer while it is executed, and it may contain one or more addresses of registers or storage locations in the computer where numbers or machine words are to be obtained or sent, and one or more operations to be executed. Synonymous with (line, program).

code, machine, same as (code, computer) (1).

code, machine language, same as (code, computer) (1) and contrasted with (code, symbolic).

code, micro, (1) a system of coding making use of suboperations not ordinarily accessible in programing; e.g., coding that makes use of parts of multiplication or division operations. (2) A list of small program steps. Combinations of these steps, performed automatically in a prescribed sequence form a macro-operation like multiply, divide, and square root.

code, minimum access, a system of coding which minimizes the effect of delays for transfer of data or instructions between storage and other

machine components. Related to (code, optimum); (code, minimum latency); and to (coding, minimum access).

code, minimum latency, same as (code, minimum access) and related to (coding, minimum access).

code, mnemonic operation, an operation code in which the names of operations are abbreviated and expressed mnemonically to facilitate remembering the operations they represent. A mnemonic code normally needs to be converted to an actual operation code by an assembler before execution by the computer. Examples of mnemonic codes are ADD for addition, CLR for clear storage and SQR for square root.

code, modulation, a code used to cause variations in a signal in accordance with a predetermined scheme; normally used to alter or modulate a carrier wave to transmit data. Clarified by (modulator).

code, multiple address, an instruction code in which an instruction word can specify more than one address to be used during the operation. In a typical instruction of a four address code the addresses specify the location of two operands, the location at which the results are to be stored and the location of the next instruction in the sequence. In a typical three address code, the fourth address specifying the location of the next instructions is dispensed with, the instructions are taken from storage in a pre-assigned order. In a typical two address code, the addresses may specify the locations of the operands. The results may be placed at one of the addresses or the destination of the results may be specified by another instruction.

code, numeric, a system of numerical abbreviations used in the preparation of information for input into a machine; i.e., all information is reduced to numerical quantities. Contrasted with (code, alphabetic).

code, one level, same as (code, absolute).

code, operation, the part of a computer instruction word which specifies, in coded form, the operation to be performed.

code, optimum, a computer code which is particularly efficient with regard to a particular aspect; e.g., minimum time of execution, minimum or efficient use of storage space, and minimum coding time. Related to (code, minimum access).

code, pseudo, same as (code, symbolic).

code, pulse, (1) a code in which sets of pulses have been assigned particular meanings, (2) the binary representations of characters.

code, punch tape, a code used to represent data on punch tape.

code, quibinary, a binary coded decimal code for representing decimal numbers in which each decimal digit is represented by seven binary digits which are coefficients of 8, 6, 4, 2, 0, 1, 0, respectively.

code, relative, a code in which all addresses are specified or written with respect to an arbitrarily selected position, or in which all addresses are represented symbolically in a computable form.

code, self checking, same as (code, error detecting).

code, self demarcating, a code in which the symbols are so arranged and selected that the generation of false combinations by interaction of segments from two successive codes is prevented.

code, skeletal, the framework of a routine which is completed by a generalized routine using input parameters.

code, specific, same as (code, absolute).

code, straight line, the repetition of a sequence of instructions, with or without address modification, by explicitly writing the instructions for each repetition. Generally straight line coding will require less execution time and more space than equivalent loop coding. If the number of repetitions is large, this type of coding is tedious unless a generator is used. The feasibility of straight line coding is limited by the space required as well as the difficulty of coding a variable number of repetitions.

code, symbolic, a code which expresses programs in source language; i.e., by referring to storage locations and machine operations by symbolic names and addresses which are independent of their hardware determined names and addresses. Synonymous with (pseudo code) and contrasted with (code, machine language).

code, two-out-of-five, a system of encoding the decimal digits 0, 1, ..., 9 where each digit is represented by binary digits of which 2 are zeros and 3 are ones or vice versa.

coded decimal, see (decimal, coded).

coded decimal notation, see (notation, coded decimal).

coded decimal number, see (number, coded decimal).

coded program, see (program, coded).

coded stop, see (stop, coded).

coder, a person who prepares instruction sequences from detailed flow charts and other algorithmic procedures prepared by others, as contrasted with a programer who prepares the procedures and flow charts.

coding, the ordered list in computer code or pseudo code, of the successive computer instructions representing successive computer operations for solving a specific problem.

coding, minimum access, the process of developing or applying a minimum access code. Related to (code, optimum), and to (code, minimum latency).

coincidence gate, see (gate, coincidence).

collate, to merge two or more ordered sets of data, or cards in order to produce one or more ordered sets which still reflect the original ordering relations. The collation process is the merging of two sequences of cards, each ordered on some mutual key, into a single sequence ordered on the mutual key.

collation sequence, see (sequence, collation).

collator, a device used to collate or merge sets or decks of cards or other units into a sequence. A typical example of a card collator has two input feeds, so that two ordered sets may enter into the process,

and four output stackers, so that four ordered sets can be generated by the process. Three comparison stations are used to route the cards to one stacker or the other on the basis of comparison of criteria as specified by plugboard wiring.

column, (1) a character or digit position in a positional information format, particularly one in which characters appear in rows, and the rows are placed one above another; e.g., the rightmost column in a five decimal place table, or in a list of data. (2) A character or digit position in a physical device, such as punch card or a register, corresponding to a position in a written table or list; e.g., the rightmost place in a register; or the third column in an eighty column punch card.

column-binary, same as (code, column-binary).

command, (1) an electronic pulse, signal or set of signals to start, stop or continue some operation. It is incorrect to use command as a synonym for instruction. (2) The portion of an instruction word which specifies the operation to be performed.

comment, an expression which explains or identifies a particular step in a routine, but which has no effect on the operation of the computer in performing the instructions for the routine.

common business oriented language, see (language, common business oriented).

common machine language, see (language, common machine).

comparator, (1) a device for comparing two different transcriptions of the same information to verify the accuracy of transcription, storage, arithmetic operation or other processes, in which a signal is given dependent upon some relation between two items; i.e., one item is larger than, smaller than, or equal to the other. (2) A form of verifier.

compare, to examine the representation of a quantity to discover its relationship to zero, or to examine two quantities usually for the purposes of discovering identity or relative magnitude.

comparison, the act of comparing and, usually, acting on the result of the comparison. The common forms are comparison of two numbers for identity, comparison of two numbers for relative magnitude, and comparison of two signs plus or minus.

compatibility, equipment, the characteristic of computers by which one computer may accept and process data prepared by another computer without conversion or code modification.

compile, to produce a machine language routine from a routine written in source language by selecting appropriate subroutines from a subroutine library, as directed by the instructions or other symbols of the original routine, supplying the linkage which combines the subroutines into a workable routine and translating the subroutines and linkage into machine language. The compiled routine is then ready to be loaded into storage and run; i.e., the compiler does not usually run the routine it produces.

compiler, a computer program more powerful than an assembler. In addition to its translating function which is generally the same process as that used in an assembler it is able to replace certain items of input with series of instructions, usually called subroutines. Thus, where an assembler translates item for item, and produces as output the same number of instructions or constants which were put into it, a compiler will do more than this. The program which results from compiling is a translated and expanded version of the original. Synonymous with (compiling routine) and related to (assembler).

compiling routine, same as (compiler).

complement, (1) a quantity expressed to the base N, which is derived from a given quantity by a particular rule; frequently used to represent the negative of the given quantity. (2) A complement on N, obtained by subtracting each digit of the given quantity from N-1, adding unity to the least significant digit, and performing all resultant carrys; e.g., the twos complement of binary 11010 is 00110; the tens complement of decimal 456 is 544. (3) A complement on N-1, obtained by subtracting each digit of the given quantity from N-1; e.g., the ones complement of binary 11010 is 00101; the nines complement of decimal 456 is 543. Synonymous with (radix minus 1 complement) and (radix complement).

complement, radix, same as (complement) (3).

complement, radix, minus 1, same as (complement (2)).

complete carry, same as (carry (2)).

complete operation, see (operation, complete).

computer, A device capable of accepting information, applying prescribed processes to the information, and supplying the results of these processes. It usually consists of input and output devices, storage, arithmetic, and logical units, and a control unit.

computer, absolute value, a computer which processes all data expressed in full values of all variables at all times. Contrasted with (computer, incremental).

computer, analog, a computer which represents variables by physical analogies. Thus any computer which solves problems by translating physical conditions such as flow, temperature, pressure, angular position, or voltage into related mechanical or electrical quantities and uses mechanical or electrical equivalent circuits as an analog for the physical phenomenon being investigated. In general it is a computer which uses an analog for each variable and produces analogs as output. Thus an analog computer measures continuously whereas a digital computer counts discretely. Related to (machine, data processing).

computer, asynchronous, a computer in which the performance of each operation starts as a result of a signal either that the previous operation has been completed; or that the parts of the computer required for the next operation are now available. Contrasted with (computer, synchronous).

computer, automatic, a computer which performs long sequences of operations without human intervention.

computer, buffered, a computing system with a storage device which permits input and output data to be stored temporarily in order to match the slow speed of input-output devices with the higher speeds of the computer. Thus, simultaneous input-output-computer operations are possible. A data transmission trap is essential for effective use of buffering since it obviates frequent testing for the availability of a data channel.

computer code, see (code, computer).

computer, digital, a computer which processes information represented by combinations of discrete or discontinuous data as compared with an analog computer for continuous data. More specifically, it is a device for performing sequences of arithmetic and logical operations, not only on data but its own program. Still more specifically it is a stored program digital computer capable of performing sequences of internally stored instructions, as opposed to calculators, such as card programed calculators, on which the sequence is impressed manually. Related to (machine, data processing).

computer efficiency, same as (ratio, operating).

computer, fixed program, a computer in which the sequence of instructions are permanently stored or wired in, and perform automatically and are not subject to change either by the computer or the programer except by rewiring or changing the storage input. Related to (computer, wired program).

computer, general purpose, a computer designed to solve a large variety of problems; e.g., a stored program computer which may be adapted to any of a very large class of applications.

computer, incremental, a computer in which changes in the variables rather than the variables themselves are represented. Those changes correspond to a change in an independent variable as defined by the equations being solved. Contrasted with (computer, absolute value).

computer-limited, pertaining to a situation in which the time required for computation exceeds the time required to read inputs and write outputs.

computer operation, see (operation, computer).

computer, parallel, a computer in which the digits or data lines are handled concurrently by separate units of the computer. The units may be interconnected in different ways as determined by the computation to operate in parallel or serially. Mixed serial and parallel machines are frequently called serial or parallel according to the way arithmetic processes are performed. An example of a parallel computer is one which handles decimal digits in parallel although it might handle the bits which comprise a digit either serially or in parallel. Contrasted with (computer, serial).

computer, serial, a computer in which digits or data lines are handled sequentially by separate units of the computer. Mixed serial and parallel machines are frequently called serial or parallel according to the way arithmetic processes are performed. An example of a serial computer is one which handles decimal digits serially although it might handle the bits which comprise a digit either serially or in parallel. Contrasted with (computer, parallel).

computer, solid state, a computer built primarily from solid state electronic circuit elements.

computer, special purpose, a computer designed to solve a specific class or narrow range of problems.

computer, stored program, a computer capable of performing sequences of internally stored instructions and usually capable of modifying those instructions as directed by the instructions.

computer, synchronous, a computer in which all operations and events are controlled by equally spaced pulses from a clock. Contrasted with (computer, asynchronous) and clarified by (frequency, clock).

computer, wired program, a computer in which the instructions that specify the operations to be performed are specified by the placement and interconnection of wires. The wires are usually held by a removable control panel, allowing flexibility of operation, but the term is also applied to permanently wired machines which are then called fixed program computers. Related to (computer, fixed program).

concept-coordination, a term used to describe the basic principles of various punched card and mechanized information retrieval systems which involve the multidimensional analysis of information and coordinate retrieval. In concept coordination, independently assigned concepts are used to characterize the subject contents of documents and the latter are identified during searching by means of either such assigned concepts or a combination of the same.

condensed instruction deck, see (deck, condensed instruction).

conditional branch, same as (transfer, conditional).

conditional breakpoint instruction, see (instruction, conditional breakpoint).

conditional jump, same as (transfer, conditional).

conditional transfer of control, a computer instruction which when reached in the course of a program will cause the computer either to continue with the next instruction in the original sequence or to transfer control to another stated instruction, depending on a condition regarding some property of a number or numbers which has then been determined.

conditional transfer, see (transfer, conditional).

conditioning, signal, to process the form or mode of a signal so as to make it intelligible to or compatible with a given device, including such manipulation as pulse shaping, pulse clipping, digitizing, and linearizing.

configuration, a group of machines which are interconnected and are programed to operate as a system.

conjunction, the logical operation which makes use of the AND operator or logical product.

The conjunction of two variables, or expressions, may be written as A·B, A∧B, A∩B, or just plain AB. These may also be described as an intersection when using Venn diagrams. Clarified by (operator, and); (gate, and) and contrasted with (disjunction).

conjunctive search, see (search, conjunctive).

connectives, logical, the operators or words, such as AND, OR, OR ELSE, IF THEN, NEITHER NOR, and EXCEPT, which make new statements from given statements and which have the property that the truth or falsity of the new statements can be calculated from the truth or falsity of the given statements and the logical meaning of the operator.

connector, variable, (1) a flow chart symbol representing a sequence connection which is not fixed, but which can be varied by the flow-charted procedure itself. (2) The device which inserts instructions in a program corresponding to selection of paths appearing in a flow chart. (3) The computer instructions which cause a logical chain to take one of several alternative paths. Synonymous with (n-way switch) and (programed switch).

console, a portion of the computer which may be used to control the machine manually, correct errors, determine the status of machine circuits, registers, and counters, determine the contents of storage, and manually revise the contents of storage.

constant area, see (area, constant).

constant instruction, see (instruction, constant).

constant(s), the quantities or messages, which will be present in the machine and available as data for the program and which, usually, are not subject to change with time.

content(s), the data contained in any storage medium. Quite prevalently, the symbol ( ) is used to indicate the contents of; e.g., (M) indicates the contents of the storage location whose address is M; or (T_2) may indicate the contents of the tape on input-output unit two.

control, (1) the part of a digital computer or processor which determines the execution and interpretation of instructions in proper sequence, including the decoding of each instruction and the application of the proper signals to the arithmetic unit and other registers in accordance with the decoded information. (2) Frequently, it is one or more of the components in any mechanism responsible for interpreting and carrying out manually-initiated directions. Sometimes it is called manual control. (3) In some business applications, a mathematical check. (4) In programing, instructions which determine conditional jumps are often referred to as control instructions, and the time sequence of execution of instructions is called the flow of control.

control card, see (card, control).

control, cascade, an automatic control system in which various control units are linked in sequence, each control unit regulating the operation of the next control unit in line.

control counter, see (counter, control).

control data, see (data, control).

control, feedback, a type of system control obtained when a portion of the output signal is operated upon and fed back to the input in order to obtain a desired effect.

control field, see (field, control).

control grid, see (grid, control).

control, manual, the direction of a computer by means of manually operated switches.

control, master, an application oriented routine usually applied to the highest level of a subroutine hierarchy.

control, numerical, descriptive of systems in which digital computers are used for the control of operations, particularly of automatic machines; e.g., drilling or boring machines, wherein the operation control is applied at discrete points in the operation or process. Contrasted with (control, process) in which control is applied continuously.

control panel, see (panel, control).

control, process, descriptive of systems in which computers, most frequently analog computers, are used for the automatic regulation of operations or processes. Typical are operations in the production of chemicals wherein the operation control is applied continuously and adjustments to regulate the operation are directed by the computer to keep the value of a controlled variable constant. Contrasted with (control, numerical).

control program, see (program, control).

control, program, descriptive of a system in which a computer is used to direct an operation or process and automatically to hold or to make changes in the operation or process on the basis of a prescribed sequence of events.

control, proportional, a method of control in which the intensity of action varies linearly as the condition being regulated deviates from the condition prescribed.

control register, see (register, control).

control sequence, see (sequence, control).

control, sequential, a mode of computer operation in which instructions are executed in consecutive order by ascending or descending addresses of storage locations, unless otherwise specified by a jump.

control, supervisory, a control system which furnishes intelligence, usually to a centralized location, to be used by an operator to supervise the control of a process or operation.

control total, see (total, control).

control, transfer, same as (transfer (4).

control, unconditional transfer of, same as (transfer, unconditional).

control unit, see (unit, control).

control word, see (word, control).

conversion, (1) the process of changing information from one form of representation to another; such as, from the language of one type of machine to that of another or from magnetic tape to the printed page. Synonymous with (conversion, data). (2) The process of changing from one data processing method to another, or from one type of equipment to another; e.g., conversion from punch card equipment to magnetic tape equipment.

conversion, binary to decimal, the process of converting a number written to the base of

two to the equivalent number written to the base of ten.

conversion, data, same as (conversion (1)).

conversion, decimal to binary, the process of converting a number written to the base of ten, or decimal, into the equivalent number written to the base of two, or binary.

conversion equipment, see (equipment, conversion).

convert, (1) to change numerical information from one number base to another (2) to transfer information from one recorded medium to another.

converter, a device which converts the representation of information, or which permits the changing of the method for data processing from one form to another; e.g., a unit which accepts information from punch cards and records the information on magnetic tape, and possibly including editing facilities.

converter, card to tape, a device which converts information directly from punched cards to punched or magnetic tape.

converter, tape to card, a device which converts information directly from punched or magnetic tape to cards.

coordinate indexing, see (indexing, coordinate).

coordinate-paper, marginally punched, continuous form graph paper normally used for printout on an XY plotter.

copy, to reproduce information in a new location, replacing whatever was previously stored there, and usually leaving the information unchanged at the original location.

copy, hard, a printed copy of machine output; e.g., printed reports, listings, documents, and summaries.

cordonnier system, same as (system, peek-a-boo).

core dump, same as (dump, storage).

core storage, same as (storage, magnetic core).

correction, automatic error, a technique, usually requiring the use of special codes and or automatic retransmission, which detects and corrects errors occurring in transmission. The degree of correction depends upon coding and equipment configuration.

counter, a device, register, or location in storage for storing numbers or number representations in a manner which permits these numbers to be increased or decreased by the value of another number, or to be changed or reset to zero or to an arbitrary value.

counter, binary, (1) a counter which counts according to the binary number system, (2) a counter capable of assuming one of two stable states.

counter, control, a device which records the storage location of the instruction word, which is to be operated upon following the instruction word in current use. The control counter may select storage locations in sequence, thus obtaining the next instruction word from the subsequent storage location, unless a transfer or special instruction is encountered.

counter, instruction, same as (counter, location (2)).

counter, location, (1) the control section register which contains the address of the instruction currently being executed. (2) A register in which the address of the current instruction is recorded. Synonymous with (instruction counter) and (program address counter).

counter, program, same as (register, control).

counter, program address, same as (counter, location (2)).

counter, ring, a loop of interconnected bistable elements such that one and only one is in a specified state at any given time and such that, as input signals are counted, the position of the element in the specified state moves in an ordered sequence around the loop.

CPU, Central Processing Unit, same as (frame, main (1)).

crippled leap frog test, see (test, crippled leap frog).

cross-bar, an automatic telephone switching system using movable switches mounted on bars. The dialed information is received and stored by common circuits which select and test the switching paths and control the operation of the switching mechanisms.

crosstalk, (1) the unwanted signals in a channel which originate from one or more other channels in the same communication system; (2) signals electrically coupled from another circuit, usually undesirably, but sometimes for useful purposes.

cryogenics, the field of technology in which the use of devices utilizing properties assumed by metals at absolute zero. At these temperatures large current changes can be obtained by relatively small magnetic field changes.

cybernetics, the field of technology involved in the comparative study of the control and intracommunication of information handling machines and nervous systems of animals and man in order to understand and improve communication.

cycle, (1) Same as (loop (1)). (2) A nonarithmetic shift in which digits dropped off at one end of a word are returned at the other end in circular fashion; e.g., cycle left and cycle right. (3) To repeat a set of operations, indefinitely or until a stated condition is met. The set of operations may be subject to variation on each repetition, as by address changes obtained by programed computation or by use of devices such as an index register. (4) An occurrence, phenomena, or interval of space or time that recurs regularly and in the same sequence; e.g., the interval required for completion of one operation in a repetitive sequence of operations.

cycle, grandfather, the period during which magnetic tape records are retained before reusing so that records can be reconstructed in the event of loss of information stored on a magnetic tape.

cycle-index, the number of times a cycle has been executed or the difference, or the negative of the difference, between the number that has been executed and the number of repetitions desired.

cycle, major, (1) the maximum access time of a recirculating serial storage element, (2) the time for one rotation of a magnetic drum or

of pulses in an acoustic delay line, (3) a number of minor cycles.

cycle, minor, the time interval between the appearance of corresponding parts of successive words in a storage device which provides serial access to storage positions.

cycle-reset, to return a cycle index to its initial value.

cycle, storage, (1) a periodic sequence of events occurring when information is transferred to or from the storage device of a computer; (2) storing, sensing, and regeneration form parts of the storage sequence.

cyclic code, same as (code, gray).

cyclic shift, see (shift, cyclic).

D

damping, a characteristic built into electrical circuits and mechanical systems to prevent rapid or excessive corrections which may lead to instability or oscillatory conditions; e.g., connecting a register on the terminals of a pulse transformer to remove natural oscillations or placing a moving element in oil or sluggish grease to prevent mechanical overshoot of the moving parts.

data, a general term used to denote any or all facts, numbers, letters and symbols, or facts that refer to or describe an object, idea, condition, situation, or other factors. It connotes basic elements of information which can be processed or produced by a computer. Sometimes data is considered to be expressible only in numerical form, but information is not so limited. Related to (information).

data, control, the items of data, one or more of which is used to identify, select, execute or modify another routine, record, file, operation or data value.

data conversion, see (conversion, data).

data element, see (element, data).

data error, see (error, data).

data handling, same as (processing, data (2)).

data, master, a set of data which is altered infrequently and supplies basic data for processing operations. The data content of a Master File. Examples include: names, badge numbers, or pay rates in personnel data; or stock numbers, stock descriptions, or units of measure in stock control data.

data origination, see (origination, data).

data phone, see (phone, data).

data processing, see (processing, data).

data processing center, see (center, data processing).

data processing machine, see (machine, data processing).

data purification, see (purification, data).

data, raw, data which has not been processed. Such data may or may not be in machine-sensible form.

data-reduction, the process of transforming masses of raw test or experimentally obtained data, usually gathered by automatic recording equipment, into useful, condensed, or simplified intelligence.

data-reduction, on-line, the processing of information as rapidly as the information is received by the computing system or as rapidly as it is generated by the source.

data, test, a set of data developed specifically to test the adequacy of a computer run or system. The data may be actual data that has been taken from previous operations, or artificial data created for this purpose.

data, transaction, a set of data in a data processing area, a record of occurrence of a new event or transaction, in which the incidence of the data is essentially random and unpredictable. Hours worked, quantities shipped, and amounts invoiced are examples from, respectively, the areas of payroll, accounts receivable, and accounts payable.

data transmission equipment, see (equipment, data transmission).

data word, see (word, data).

datamation, a shortened term for automatic data processing; taken from data and automation.

date, delivery, the date of physical delivery on-site of the components of the computer configuration without regard to whether or not they have been unpacked, placed in final position, or interconnected. Delivery of equipment carries no connotation of operational status.

date, installation, the date new equipment is ready for use. The commencement of rental normally begins on the day following the date on which the contractor officially notifies the using organization that the equipment is installed and ready for use, subject to the acceptance and standard of performance provisions of the applicable contract.

d.c. coupled, the connection by a device which passes the steady state characteristics of a signal and which largely eliminates the transient or oscillating characteristics of the signal.

d.c. dump, see (dump, d.c.).

DDA, Digital Differential Analyzer, see (analyzer, digital differential).

dead band, see (band, dead).

dead halt, same as (halt, drop dead).

dead space, same as (band, dead).

dead time, see (time, dead).

dead zone, same as (band, dead).

debug, (1) to locate and correct any errors in a computer program. (2) To detect and correct malfunctions in the computer itself. Related to (routine, diagnostic).

debugging aid routine, see (routine, debugging aid).

decade, a group or assembly of ten units; e.g., a counter which counts to ten in one column or a resistor box which inserts resistance quantities in multiples of powers of 10.

decay time, see (time, decay).

deceleration time, see (time, deceleration).

decimal, binary coded, describing a decimal notation in which the individual decimal digits are represented by a pattern of ones and zeros; e.g., in the 8-4-2-1 coded decimal notation, the number twelve is represented as 0001 0010 for 1 and 2, respectively, whereas in pure or straight binary notation it is represented as 1100. Related to (binary).

decimal, coded, describing a form of notation by which each decimal digit separately is expressed in some other number system;

e.g., in the 8-4-2-1 coded decimal notation, the number twelve is represented as 0001 0010, for 1 and 2; whereas in pure or straight binary notation it is represented as 1100. Other coded decimal notations used are the 5-4-2-1, the excess three, and the 2-3-2-1 codes.

decimal coded digit, see (digit, decimal coded).

decimal number, see (number, decimal).

decimal numbering system, see (system, decimal numbering).

decimal to binary conversion, see (conversion, decimal to binary).

decision, the computer operation of determining if a certain relationship exists between words in storage or registers, and taking alternative courses of action. This is effected by conditional jumps or equivalent techniques. Use of this term has given rise to the misnomer "magic brain;" actually the process consists of making comparisons by use of arithmetic to determine the relationship of two terms (numeric, alphabetic or a combination of both); e.g., equal, greater than, or less than.

decision box, see (box, decision).

decision, logical, the choice or ability to choose between alternatives. Basically this amounts to an ability to answer yes or no with respect to certain fundamental questions involving equality and relative magnitude; e.g., in an inventory application, it is necessary to determine whether or not there has been an issue of a given stock item.

deck, a collection of cards, commonly a complete set of cards which have been punched for a definite service or purpose.

deck, condensed instruction, the card output from an assembly program in which several instructions per card are punched in machine language. Input to the assembly program may consist of one instruction per card, thus, the name condensed is used for output.

decode, (1) to apply a code so as to reverse some previous encoding; (2) to determine the meaning of individual characters or groups of characters in a message; (3) to determine the meaning of an instruction from the set of pulses which describes the instruction, command, or operation to be performed.

decoder, (1) a device which determines the meaning of a set of signals and initiates a computer operation based thereon. (2) A matrix of switching elements which selects one or more output channels according to the combination of input signals present. Contrasted with (encoder) and clarified by (matrix).

decoding, (1) performing the internal operations by which a computer determines the meaning of the operation code of an instruction; also sometimes applied to addresses. In interpretive routines and some subroutines, an operation by which a computer determines the meaning of parameters in the routine. (2) Translating a secretive language into the clear.

decrement, (1) the quantity by which a variable is decreased. (2) A specific part of an instruction word in some binary computers, thus a set of digits.

decrement field, see (field, decrement).

definition, (1) the resolution and sharpness of an image, or the extent to which an image is brought into sharp relief; (2) the degree with which a communication system reproduces sound images or messages.

definition, problem, the art of compiling logic in the form of general flow charts and logic diagrams which clearly explain and present the problem to the programer in such a way that all requirements involved in the run are presented.

deflection-sensitivity, used in connection with cathode ray tubes, the quotient of the change in displacement of the electron beam at the place of impact, divided by the change in the deflecting field. It is usually expressed in millimeters per volt applied between the deflection electrode plates for electrostatic field deflection, or in millimeters per gauss for magnetic field deflection.

delay, (1) the length of time after the close of a reporting period before information pertaining to that period becomes available. Delay may also cover the time to process data, and prepare and distribute reports. (2) The retardation of the flow of information in a channel for a finite period of time.

delay, differential, the difference between the maximum and the minimum frequency delays occurring across a band.

delay line, see (line, delay).

delimiter, a character which limits a string of characters, and therfore cannot be a member of the string.

delivery date, see (date, delivery).

demodulator, (1) a device which receives tones from a transmission circuit and converts them to electrical pulses, or bits, which may be accepted by a business machine. (2) A device which detects the modulating signals, thus removes the carrier signal and reconstitutes the intelligence. Clarified by (code, modulation) and contrasted with (modulator).

density, character, the number of characters that can be stored per unit of length; e.g., on some makes of magnetic tape drives, 200 or 556 bits can be stored serially, linearly, and axially to the inch.

density, packing, the number of units of useful information contained within a given linear dimension, usually expressed in units per inch; e.g., the number of binary digit magnetic pulses or number of characters stored on tape or drum per linear inch on a single track by a single head.

descriptor, an elementary term, word, or simple phrase used to identify a subject, concept, or idea.

design, item, the specification of what fields make up an item, the order in which the fields are to be recorded, and the number of characters to be allocated to each field.

design, logical, (1) the planning of a data processing system prior to its detailed engineering design. (2) The synthesizing of a network of logical elements to perform a specified function. (3) The result of (1) and (2), frequently called the logic of a computer or of a data processing system.

detail file, see (file, detail).

device, analog, a mechanism which represents numbers by physical quantities; e.g., by lengths, as in a slide rule, or by voltage currents as in a differential analyzer or a computer of the analog type.

device, film optical sensing, a piece of equipment capable of reading the contents of a film by optical methods; i.e., a system consisting of a light source, lenses, photo-cells and a film moving mechanism. The output of the device is digitized and transferred directly to an electronic computer. An example of such a device is the FOSDIC system developed jointly by the Bureau of Census and the National Bureau of Standards.

device, input, the mechanical unit designed to bring data to be processed into a computer; e.g., a card reader, a tape reader, or a keyboard.

device, output, the part of a machine which translates the electrical impulses representing data processed by the machine into permanent results such as printed forms, punched cards, and magnetic writing on tape.

diagnostic routine, see (routine, diagnostic).

diagnostic test, see (test, diagnostic).

diagnotor, a combination diagnostic and edit routine which questions unusual situations and notes the implied results.

diagram, (1) a schematic representation of a sequence of subroutines designed to solve a problem. (2) A coarser and less symbolic representation than a flow chart, frequently including descriptions in English words. (3) A schematic or logical drawing showing the electrical circuit or logical arrangements within a component.

diagram, block, (1) a graphical representation of the hardware in a computer system. The primary purpose of a block diagram is to indicate the paths along which information and/or control flows between the various parts of a computer system. It should not be confused with the term flow chart. (2) A coarser and less symbolic representation than a flow chart.

diagram, flow, same as (chart, flow).

diagram, logical, a diagram which represents the logical elements of a system and their interconnections without necessarily expressing construction, engineering or electrical schematic circuit details.

diagram, venn, a diagram in which each point represents an individual. Sets are represented by closed regions including all members of the set and excluding all nonmembers. The diagram is used to facilitate determination whether several sets include or exclude the same individuals.

di-cap storage, see (storage, di-cap).

dichotomizing search, same as (search, binary).

dictionary, a list of code names used in a routine or system and their intended meaning in that routine or system.

dictionary, automatic, the component of a language translating machine which will provide a word for word substitution from one language to another. In automatic searching systems, the automatic dictionary is the component which substitutes codes for words or phrases during the encoding operation. Related to (translation, machine).

dictionary code, see (code, dictionary).

dictionary, reverse code, an alphabetic or numeric alphabetic arrangement of codes, associated with their corresponding English words or terms. Related to (code, dictionary).

difference, logical, all elements belonging to class A but not to class B, when two classes of elements, class A and class B, are given.

differential analyzer, see (analyzer, differential).

differential delay, see (delay, differential).

differentiator, a device whose output function is proportional to a derivative; i.e., the rate of change, of its input function with respect to one or more variables.

digit, a sign or symbol used to convey a specific quantity of information either by itself or with other numbers of its set; e.g., 2, 3, 4, and 5 are digits. The base or radix must be specified and each digit's value assigned.

digit, binary, a numeral in the binary scale of notation. This digit may be zero (0), or one (1). It may be equivalent to an on or off condition, a yes, or a no. Often abbreviated to (bit).

digit, check, one or more redundant digits carried along with a machine word and used in relation to the other digits in the word as a self-checking or error-detecting code to detect malfunctions of equipment in data transfer operations. Related to (check, forbidden combination) and (check, parity).

digit, decimal coded, a digit or character defined by a set of decimal digits, such as a pair of decimal digits specifying a letter or special character in a system of notation.

digit, octal, the symbol 0, 1, 2, 3, 4, 5, 6, or 7 used as a digit in the system of notation which uses 8 as the base or radix. Clarified by (systems, number).

digit, sign, a character, frequently a single bit, used to designate the algebraic sign of the quantity. Synonymous with (sign bit).

digital, pertaining to the utilization of discrete integral numbers in a given base to represent all the quantities that occur in a problem or a calculation. It is possible to express in digital form all information stored, transferred, or processed by a dual state condition; e.g., on-off, open-closed, and true-false.

digital computer, see (computer, digital).

digital differential analyzer, see (analyzer, digital differential).

digitize, to convert an analog measurement of a physical variable into a numerical value, thereby expressing the quantity in digital form. Synonymous with (quantize).

digitizer, a device which converts an analog measurement into digital form. Synonymous with (quantizer).

digit(s), equivalent binary, the number of binary digits required to express a number in another base with the same precision; e.g., approximately 3 1/3 binary digits are required to express in binary form each digit of a decimal number. For the case of coded

decimal notation, the number of binary digits required is usually 4 times the number of decimal digits.

digit(s), significant, a set of digits, usually from consecutive columns beginning with the most significant digit different from zero and ending with the least significant digit whose value is known and assumed relevant; e.g., 2300.0 has five significant digits, whereas 2300 probably has two significant digits; however, 2301 has four significant digits and 0.0023 has two significant digits.

diode, a device used to permit current flow in one direction in a circuit and to inhibit current flow in the other. In computers, these are primarily germanium or silicon crystals.

direct address, see (address, direct).

direct code, see (code, direct).

direct insert subroutine, same as (subroutine, open).

directory, a file with the layout for each field of the record which it describes; thus a directory describes the layout of a record within a file.

disjunction, the logical operation which makes use of the OR operator or the logical sum. The disjunction of two variables, or expressions, may be written as A+B, A∨B, or A∪B. These may also be described as a union when using Venn diagrams. Clarified by (operator, or); (gate, or) and contrasted with (conjunction).

disjunctive search, see (search, disjunctive).

disk, magnetic, a storage device on which information is recorded on the magnetizable surface of a rotating disk. A magnetic disk storage system is an array of such devices, with associated reading and writing heads which are mounted on movable arms. Related to (storage, disk).

disk storage, see (storage, disk).

disperse, a data processing operation in which input items or fields are distributed or duplicated in more than one output item or field.

display tube, see (tube, display).

distributor, the electronic circuity which acts as an intermediate link between the accumulator and drum storage.

distributor, time-pulse, a device or circuit for allocating timing pulses or clock pulses to one or more conducting paths or control lines in specified sequence.

document, (1) a form, voucher, or written evidence of a transaction; (2) to instruct, as by citation of references; (3) to substantiate, as by listing of authorities.

document, source, a document from which basic data is extracted.

documentation, the group of techniques necessary for the orderly presentation, organization and communication of recorded specialized knowledge, in order to maintain a complete record of reasons for changes in variables. Documentation is necessary not so much to give maximum utility as to give an unquestionable historical reference record.

docuterm, a word or phrase descriptive of the subject matter or concept of an item of information and considered important for later retrieval of information. Related to (card, aspect).

double length number, see (number, double length).

double precision, see (precision, double).

double precision number, same as (number, double length).

double precision quantity, see (quantity, double precision).

down time, see (time, down).

drive, tape, same as (transport, tape). Synonymous with (unit, tape), and clarified by (unit, magnetic tape), and (unit, paper tape).

drop dead halt, see (halt, drop dead).

drops, false, the documents spuriously identified as pertinent by an information retrieval system, but which do not satisfy the search requirements, due to causes such as improper coding, punching spurious or wrong combinations of holes, or improper use of terminology. Related to (noise).

drum, magnetic, a cylinder having a surface coating of magnetic material, which stores binary information by the orientation of magnetic dipoles near or on its surface. Since the drum is rotated at a uniform rate, the information stored is available periodically as a given portion of the surface moves past one or more flux detecting devices called heads located near the surface of the drum.

drum mark, see (mark, drum).

dummy, an artificial address, instruction, or record of information inserted solely to fulfill prescribed conditions, such as to achieve a fixed word length or block length, but without itself affecting machine operations except to permit the machine to perform desired operations.

dummy instruction, see (instruction, dummy).

dump, a.c., the removal of all alternating current power intentionally, accidentially or conditionally from a system or component. An a.c. dump usually results in the removal of all power, since direct current is usually supplied through a rectifier or converter.

dump, change, a print-out or output recording of the contents of all storage locations in which a change has been made since the previous change dump.

dump check, see (check, dump).

dump, core, same as (dump, storage).

dump, d.c., the removal of all direct current power, intentionally, accidentially, or conditionally, from a system or component.

dump, memory, same as (dump, storage).

dump, post mortem, a listing of the contents of a storage device taken after a routine has been run in order that the final condition of sections of storage may be recorded for debugging purposes.

dump, power, the removal of all power accidentally or intentionally.

dump, snapshot, a dynamic partial print out during computing, at breakpoints and checkpoints, or selected items in storage.

dump, storage, a listing of the contents of a storage device, or selected parts of it. Synonymous with (memory dump), (core dump) and (memory print-out).

duodecimal number, see (number, duodecimal).

duoprimed word, see (word, duoprimed).
duplex, pertaining to a twin, a pair or a two-in-one situation; e.g., a channel providing simultaneous transmission in both directions or a second set of equipment to be used in event of the failure of the primary or either device.
duplication check, see (check, duplication).
dynamic memory, same as (storage, dynamic).
dynamic storage, see (storage, dynamic).
dynamic subroutine, see (subroutine, dynamic).

E

EAM, Electrical Accounting Machine, see (machine, electrical accounting).
Eccles-Jordan circuit, same as (flip-flop).
Eccles-Jordan trigger, same as (flip-flop).
echo check, see (check, echo).
edge notched card, see (card, edge notched).
edge punched card, see (card, edge punched).
edit, to rearrange data or information. Editing may involve the deletion of unwanted data, the selection of pertinent data, the application of format techniques, the insertion of symbols such as page numbers and typewriter characters, the application of standard processes such as zero suppression, and the testing of data for reasonableness and proper range. Editing may sometimes be distinguished between input edit (rearrangement of source data) and output edit (preparation of table formats).
edit, post, to edit the results of a previous computation.
editor, a routine which performs editing operations.
EDP, Electronic Data Processing, see (processing, electronic data).
effective address, see (address, effective).
eighty (80) column card, see (card, eighty (80) column).
electric delay line, see (line, electric delay).
electrical accounting machine, see (machine, electrical accounting).
electronic, pertaining to that branch of science which deals with the motion, emission and behavior of currents of free electrons, especially in vacuum, gas or phototubes and special conductors or semi-conductors. This is contrasted with electric which pertains to the flow of large currents in metal conductors.
electronic calculating punch, see (punch, electronic calculating).
electronic data processing, see (processing, electronic data).
electronic data processing equipment, same as (equipment, automatic data processing (1)).
electronic data processing machine, see (machine, electronic data processing).
electronic data processing system, see (system, electronic data processing).
electronic differential analyzer, see (analyzer, electronic differential).
electronic switch, see (switch, electronic).
electrostatic printer, same as (printer, xerographic).
electrostatic storage, see (storage, electrostatic).
element, data, a specific item of information appearing in a set of data; e.g., in the following set of data, each item is a data element: the quantity of a supply item issued, a unit rate, an amount, and the balance of stock items on hand.
element, logical, the smallest building block in a computer or data processing system, which can be represented by logical operators in an appropriate system of symbolic logic. Typical logical elements are the AND-gate and the OR-gate, which can be represented as operators in a suitable symbolic logic.
eleven punch (11-punch), same as (punch, x (2)).
encipher, same as (encode (1) and (2)).
encode, (1) to apply a code, frequently one consisting of binary numbers, to represent individual characters or groups of characters in a message. Synonymous with (encipher). Inverse of (decode). (2) To substitute letters, numbers, or characters for other numbers, letters, or characters, usually to intentionally hide the meaning of the message except to certain individuals who know the enciphering scheme. Synonymous with (encipher).
encoded question, see (question, encoded).
encoder, a device capable of translating from one method of expression to another method of expression, e.g., translating a message, "add the contents of A to the contents of B", into a series of binary digits. Contrasted with (decoder) and clarified by (matrix).
end around carry, same as (carry (2)).
end around shift, same as (shift, cyclic).
end of file, termination or point of completion of a quantity of data. End of file marks are used to indicate this point. Synonymous with (EOF).
end of file indicator, see (indicator, end of file).
end mark, see (mark, end).
engineering time, see (time, engineering).
english, ruly, a form of English in which every word has one and only one conceptual meaning and each concept has one and only one word to describe it. This is a hypothetical language based on English which complies uniformly to a definite set of rules, without exceptions.
entry, (1) a statement in a programing system. In general each entry is written on one line of a coding form and punched on one card, although some systems permit a single entry to overflow several cards. (2) A member of a list.
entry, keyboard, (1) an element of information inserted manually, usually via a set of switches or marked punch levers, called keys, into an automatic data processing system; (2) a medium as in (1) above for achieving access to or entrance into an automatic data processing system.
EOF, End Of File, see (end of file).
equation solver, see (solver, equation).
equipment, automatic data processing, (1) a machine, or group of interconnected machines, consisting of input, storage, computing, control, and output devices, which uses electronic circuitry in the main computing element to perform arithmetic and/or logical

operations automatically by means of internally stored or externally controlled programed instructions. Synonymous with (equipment, electronic data processing). (2) The data processing equipment which directly supports or services the central computer operation. Clarified by (equipment, peripheral).

equipment, auxiliary, same as (equipment, off-line (1)).

equipment compatibility, see (compatibility, equipment).

equipment, conversion, the equipment that is capable of transposing or transcribing the information from one type of data processing medium to render it acceptable as input to another type of processing medium.

equipment, data transmission, the communications equipment used in direct support of data processing equipment.

equipment, electronic data processing, same as (equipment, automatic data processing (1)).

equipment-failure, a fault in the equipment, excluding all external factors, which prevents the accomplishment of a scheduled job.

equipment, input, (1) the equipment used for transferring data and instructions into an automatic data processing system, (2) the equipment by which an operator transcribes original data and instructions to a medium that may be used in an automatic data processing system.

equipment, off-line, the peripheral equipment or devices not in direct communication with the central processing unit of a computer. Synonymous with (auxiliary equipment).

equipment, on-line, descriptive of a system and of the peripheral equipment or devices in a system in which the operation of such equipment is under control of the central processing unit, and in which information reflecting current activity is introduced into the data processing system as soon as it occurs. Thus, directly in-line with the main flow of transaction processing. Synonymous with (in-line processing), and (on-line processing).

equipment, output, the equipment used for transferring information out of a computer.

equipment, peripheral, the auxiliary machines which may be placed under the control of the central computer. Examples of this are card readers, card punches, magnetic tape feeds and high-speed printers. Peripheral equipment may be used on-line or off-line depending upon computer design, job requirements and economics. Clarified by (equipment, automatic data processing) and by (equipment, off-line).

equipment, tabulating, the machines and equipment using punch cards. The group of equipment is called tabulating equipment because the main function of installations of punch card machines for some 20 years before the first automatic digital computer was to produce tabulations of information resulting from sorting, listing, selecting, and totaling data on punch cards. This class of equipment is commonly called PCM or tab equipment. Similar to (machine, electrical accounting), clarified by (tabulator).

equivalent binary digits, see (digits, equivalent binary).

erasable storage, see (storage, erasable).

erase, to replace all the binary digits in a storage device by binary zeros. In a binary computer, erasing is equivalent to clearing, while in a coded decimal computer where the pulse code for decimal zero may contain binary ones, clearing leaves decimal zero while erasing leaves all-zero pulse codes in all storage locations. Clarified by (clear).

error, (1) the general term referring to any deviation of a computed or a measured quantity from the theoretically correct or true value. (2) The part of the error due to a particular identifiable cause; e.g., a truncation error, or a rounding error. In a restricted sense, that deviation due to unavoidable random disturbances, or to the use of finite approximations to what is defined by an infinite series. Contrasted with (mistake). (3) The amount by which the computed or measured quantity differs from the theoretically correct or true value.

error, absolute, the magnitude of the error disregarding the algebraic sign or if a vectorial error, disregarding its direction.

error, balanced (range of), (1) a range of error in which the maximum and minimum possible errors are opposite in sign and equal in magnitude, (2) a range of error in which the average value is zero.

error correcting code, see (code, error correcting).

error, data, a deviation from correctness in data, usually an error, which occurred prior to processing the data.

error detecting code, see (code, error detecting).

error detection routine, see (routine, error detection).

error, inherent, same as (error, inherited).

error, inherited, the error in the initial values. Especially the error inherited from the previous steps in the step by step integration. This error could also be the error introduced by the inability to make exact measurements of physical quantities. Synonymous with (inherent error).

error, machine, a deviation from correctness in data resulting from an equipment failure.

error, propagated, an error occurring in one operation which spreads through and influences later operations and results.

error range, see (range, error).

error rate, see (rate, error).

error, residual, the difference between an optimum result derived from experience or experiment and a supposedly exact result derived from theory.

error, rounding, the error resulting from rounding off a quantity by deleting the less significant digits and applying some rule of correction to the part retained; e.g., 0.2751 can be rounded to 0.275 with a rounding error of .0001. Synonymous with (round-off error) and contrasted with (error, truncation).

error, round-off, same as (error, rounding).

error, truncation, the error resulting from the use of only a finite number of terms of an infinite series, or from the approximation of operations in the infinitesimal calculus by operations in the calculus of finite differences. It is frequently convenient to define truncation error, by exclusion, as any error generated in a computation not due to rounding, initial conditions or mistakes. A truncation error would thus be that deviation of a computed quantity from the theoretically correct value that would be present even in the hypothetical situation in which no mistakes were made, all given data were exact, no inherited error, and infinitely many digits retained in all calculations. Contrasted with (error, rounding).

evaluation, performance, the analysis in terms of initial objectives and estimates, and usually made on-site, of accomplishments using an automatic data processing system, to provide information on operating experience and to identify corrective actions required if any.

except gate, see (gate, except).

exception principle system, see (system, exception principle).

excess-fifty, a binary representation in which the decimal number 'n' is represented by the binary equivalent of (n+50).

excess-three code, see (code, excess-three).

exchange, to interchange the contents of two storage devices or locations.

exchange, message, a device, placed between a communication line and a computer, in order to take care of certain communication functions and thereby free the computer for other work.

exclusive or operator, see (operator, exclusive or).

execute, to interpret a machine instruction and perform the indicated operation(s) on the operand(s) specified.

execution of an instruction, the set of elementary steps carried out by the computer to produce the result specified by the operation code of the instruction.

execution time, see (time, execution).

executive routine, see (routine, executive).

executive system, same as (system, operating).

exit, a way of momentarily interrupting or leaving a repeated cycle of operations in a program.

expression, any symbol representing a variable or a group of symbols representing a group of variables possibly combined by symbols representing operators in accordance with a set of definitions and rules.

external memory, same as (storage, external).

external storage, see (storage, external).

extract, (1) to copy from a set of items all those items which meet a specified criterion. (2) To remove only a given set of digits or characters occupying certain specified locations in a computer word, such as extract the 8, 9, and 10 binary digits of a 44-bit word, as specified by the filter. Clarified by (filter). (3) To derive a new computer word from part of another word, usually by masking. Related to (unpack).

extractor, same as (filter).

F

factor, scale, the coefficients used to multiply or divide quantities in a problem in order to convert them so as to have them lie in a given range of magnitude; e.g., plus one to minus one.

false drops, see (drops, false).

false retrievals, see (retrievals, false).

fast access storage, see (storage, fast access).

feed, (1) to supply the material to be operated upon to a machine. (2) A device capable of feeding as in definition #1.

feed, card, a mechanism which moves cards serially into a machine.

feed, tape, a mechanism which will feed tape to be read or sensed.

feedback, the part of a closed loop system which automatically brings back information about the condition under control.

feedback control, see (control, feedback).

feedback control signal, see (signal, feedback control).

ferroelectric, pertaining to a phenomenon exhibited by certain materials in which the material is polarized in one direction or the other, or reversed in direction by the application of a positive or negative electric field of magnitude greater than a certain amount. The material retains the electric polarization unless it is disturbed. The polarization can be sensed by the fact that a change in the field induces an electromotive force which can cause a current.

ferromagnetic, pertaining to a phenomenon exhibited by certain materials in which the material is polarized in one direction or the other, or reversed in direction by the application of a positive or negative magnetic field of magnitude greater than a certain amount. The material retains the magnetic polarization unless it is disturbed. The polarization can be sensed by the fact that a change in the field induces an electromotive force, which can cause a current.

fetch, to obtain a quantity of data from a place of storage.

field, an assigned area in a record to be marked with information.

field, card, a set of card columns, either fixed as to number and position or, if variable, then identifiable by position relative to other fields. Corresponding fields on successive cards are normally used to store similar information.

field, control, a constant location where information for control purposes is placed; e.g., in a set of punch cards, if columns 79 and 80 contain various codes which control whether or not certain operations will be performed on any particular card, then columns 79 and 80 constitute a control field.

field, decrement, a portion of an instruction word set aside specifically for modifying the contents of a register or storage location.

field, fixed, a given field on punch cards or a given number of holes along the edge of an edge punched card, set aside for the recording

of a given type or classification of information.

field, free, a property of information processing recording media which permit recording of information without regard to a preassigned or fixed field; e.g., in information retrieval devices information may be dispersed in the record in any sequence or location.

field length, see (length, field).

field, signed, a field which has a plus or minus character coding over the units position to designate the algebraic sign of the entire number.

file, an organized collection of information directed toward some purpose. The records in a file may or may not be sequenced according to a key contained in each record.

file, detail, a file of information which is relatively transient. This is contrasted with a master file which contains relatively more permanent information; e.g., in the case of weekly payroll for hourly employees, the detail file will contain employee number, regular time, and overtime, the hours such employee has worked in a given week, and other information changing weekly. The master file will contain the employee's name, number, department, rate of pay, deduction specifications, and other information which regularly stays the same from week to week.

file gap, see (gap, file).

file identification, see (identification, file).

file maintenance, see (maintenance, file).

file, master, a file containing relatively permanent information.

file protection, see (protection, file).

film optical sensing device, see (device, film optical sensing).

Filmorex system, see (system, Filmorex).

filter, a machine word that specifies which parts of another machine word are to be operated upon, thus the criterion for an external command. Synonymous with (extractor) and (mask) and clarified by (extract (2)).

first level address, same as (address, direct).

fixed cycle operation, see (operation, fixed cycle).

fixed field, see (field, fixed).

fixed length record, see (record, fixed length).

fixed point arithmetic, see (arithmetic, fixed point).

fixed point calculation, see (calculation, fixed point).

fixed program computer, see (computer, fixed program).

fixed word length, see (word length, fixed).

flag, (1) a bit of information attached to a character or word to indicate the boundary of a field. (2) An indicator used frequently to tell some later part of a program that some condition occurred earlier. (3) An indicator used to identify the members of several sets which are intermixed. Synonymous with (sentinel).

flip-flop, (1) a bi-stable device; i.e., a device capable of assuming two stable states. (2) A bi-stable device which may assume a given stable state depending upon the pulse of history of one or more input points and having one or more output points. The device is capable of storing a bit of information. (3) A control device for opening or closing gates; i.e., a toggle. Synonymous with (Eccles-Jordan circuit) and (Eccles-Jordan trigger).

floating address, see (address, floating).

floating decimal arithmetic, same as (arithmetic, floating point).

floating point arithmetic, see (arithmetic, floating point).

floating point calculation, see (calculation, floating point).

floating point routine, see (routine, floating point).

flow chart, see (chart, flow).

flow diagram, same as (chart, flow).

flying spot, see (spot, flying).

forbidden combination check, see (check, forbidden combination).

force, to intervene manually in a routine and cause the computer to execute a jump instruction.

form stop, see (stop, form).

formal logic, see (logic, formal).

format, the predetermined arrangement of characters, fields, lines, page numbers, and punctuation marks, usually on a single sheet or in a file. This refers to input, output and files.

FORTRAN, a programing language designed for problems which can be expressed in algebraic notation, allowing for exponentiation and up to three subscripts. The FORTRAN compiler is a routine for a given machine which accepts a program written in FORTRAN source language and produces a machine language routine object program. FORTRAN II added considerably to the power of the original language by giving it the ability to define and use almost unlimited hierarchies of subroutines, all sharing a common storage region if desired. Later improvements have added the ability to use Boolean expressions, and some capabilities for inserting symbolic machine language sequences within a source program.

FOSDIC, Film Optical Sensing Device for Input to Computers, same as (device, film optical sensing).

four address, see (address, four).

four address instruction, see (instruction, four address).

four-wire circuit, see (circuit, four-wire).

frame, main, (1) the central processor of the computer system. It contains the main storage, arithmetic unit and special register groups. Synonymous with (CPU) and (central processing unit). (2) All that portion of a computer exclusive of the input, output, peripheral and in some instances, storage units.

free field, see (field, free).

frequency, clock, the master frequency of periodic pulses which schedules the operation of the computer. Clarified by (computer, synchronous).

frequency response, see (response, frequency).

function switch, see (switch, function).

function table, see (table, function).

function, transfer, (1) a mathematical expression frequently used by control engineers which expresses the relationship between the outgoing and the incoming signals of a process,

or control element. The transfer function is useful in studies of control problems. (2) A mathematical expression or expressions which describe(s) the relationship between physical conditions at two different points in time or space in a given system, and perhaps, also, describes the role played by the intervening time or space.

functor, an improper term to be avoided. This term is sometimes used to designate a logic element which performs a specific function or provides a linkage between variables.

G

gain, the ratio between the output signal and the input signal of a device.

game theory, see (theory, game).

gang punch, see (punch, gang).

gap, (1) an interval of space or time used as an automatic sentinel to indicate the end of a word, record, or file of data on a tape; e.g., a word gap at the end of a word, a record or item gap at the end of a group of words, and a file gap at the end of a group of records or items. (2) The absence of information for a specified length of time or space on a recording medium, as contrasted with marks and sentinels which are the presence of specific information to achieve a similar purpose. Marks are used primarily internally in variable word length machines. Sentinels achieve similar purposes either internally or externally; however, sentinels are programed rather than inherent in the hardware. Related to (gap, file) and (symbol, terminating). (3) The space between the reading or recording head and the recording medium, such as tape, drum, or disk. Related to (gap, head).

gap, file, an interval of space or time associated with a file to indicate or signal the end of the file. Related to (gap (2)).

gap, head, (1) the space between the reading or recording head and the recording medium, such as tape, drum or disk; (2) the space or gap intentionally inserted into the magnetic circuit of the head in order to force or direct the recording flux into the recording medium.

gap, inter-record, an interval of space or time, deliberately left between recording portions of data or records. Such spacing is used to prevent errors through loss of data or overwriting, and permits tape stop-start operations.

gap, record, an interval of space or time associated with a record to indicate or signal the end of the record.

gate, a circuit which yields an output signal that is dependent on some function of its present or past input signals.

gate, and a signal circuit with two or more input wires in which the output wire gives a signal, if and only if, all input wires receive coincident signals. Synonymous with (and circuit) and clarified by (conjunction).

gate, coincidence, a circuit with the ability to produce an output which is dependent upon a specified type of or the coincident nature of the input; e.g., an AND gate has an output pulse when there are pulses in time coincidence at all inputs; an OR gate has an output when any one or any combination of input pulses occur in time coincidence. Any gate may contain a number of inhibits, in which there is no output under any condition of input if there is time coincidence of an inhibit or except signal.

gate, except, a gate in which the specified combination of pulses producing an output pulse is the presence of a pulse on one or more input lines and the absence of a pulse on one or more other input lines.

gate, or, an electrical gate or mechanical device which implements the logical OR operator. An output signal occurs whenever there are one or more inputs on a multi-channel input. An OR gate performs the function of the logical "inclusive OR Operator." Synonymous with (or circuit) and clarified by (disjunction).

gate pulse, see (pulse, gate).

general program, see (program, general).

general purpose computer, see (computer, general purpose).

general routine, same as (program, general).

generate, to produce or prepare a specific item in accordance with a specific and defined rule or program over a period of time.

generating routine, see (routine, generating).

generator, program, a program which permits a computer to write other programs, automatically. Generators are of two types: (a) the character controlled generator, which operates like a compiler in that it takes entries from a library tape, but unlike a simple compiler in that it examines control characters associated with each entry, and alters instructions found in the library according to the directions contained in the control characters. (b) The pure generator which is a program that writes another program. When associated with an assembler a pure generator is usually a section of program which is called into storage by the assembler from a library tape and which then writes one or more entries in another program. Most assemblers are also compilers and generators. In this case the entire system is usually referred to as an assembly system. Related to (language, problem oriented).

generator, random number, a special machine routine or hardware designed to produce a random number or series of random numbers according to specified limitations.

generator, report, a technique for producing complete data processing reports giving only a description of the desired content and format of the output reports, and certain information concerning the input file.

gigacycle, a kilomegacycle per second, 10^9 cycles per second. Synonymous with (kilomegacycle).

grandfather cycle, see (cycle, grandfather).

graphic panel, see (panel, graphic).

gray code, see (code, gray).

grid, control, the electrode of a vacuum tube other than a diode upon which a signal voltage is impressed in order to regulate the plate current, usually electrode or grid number 1.

group mark, see (mark, group).
grouping of records, see (records, grouping of).
gulp, several bytes, thus a part of a word.

H

half-adder, a circuit having two output points, S and C, representing sum and carry, and two input points, A and B, representing addend and augend, such that the output is related to the input according to the following table:

INPUT		OUTPUT	
A	B	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

A and B are arbitrary input pulses, and S and C are sum without carry and carry, respectively. Two half-adders, properly connected, may be used for performing binary addition and form a full serial adder.

half-adjust, a kind of rounding in which the value of the least significant digit of a number determines whether or not a one shall be added to the next higher significant digit, or, in which the two least significant digits determine whether or not a one is to be added to the next higher significant digit. If the least significant digits represent less than one-half, nothing is added to the next higher significant digit, if the least significant digits represent one-half or more than a one is added to the next higher significant digit.

half duplex service, see (service, half duplex).

halt, dead, same as (halt, drop dead).

halt, drop dead, a machine halt from which there is no recovery. Such a halt may be deliberately programed. A drop dead halt may occur through a logical error in programing. Examples in which a drop dead halt could occur are division by zero and transfer to a non-existent instruction word. Synonymous with (dead halt).

handling, data, same as (processing, data (2)).

hang-up, a nonprogramed stop in a routine. It is usually an unforeseen or unwanted halt in a machine pass. It is most often caused by improper coding of a machine instruction or by the attempted use of a non-existent or improper operation code.

hard copy, see (copy, hard).

hardware, the physical equipment or devices forming a computer and peripheral equipment. Contrasted with (software).

hardware check, same as (check, automatic).

hash total, see (total, hash).

head, a device which reads, records or erases information in a storage medium, usually a small electromagnet used to read, write or erase information on a magnetic drum or tape or the set of perforating or reading fingers and block assembly for punching or reading holes in paper tape or cards.

head gap, see (gap, head).

head, read write, a small electromagnet used for reading, recording, or erasing polarized spots, which represent information, on magnetic tape, disk or drum.

heuristic, pertaining to trial and error methods of obtaining solutions to problems.

heuristic program, same as (routine, heuristic).

heuristic routine, see (routine, heuristic).

hexadecimal number, same as (number, sexadecimal).

hierarchy, a specified rank or order of items, thus, a series of items classified by rank or order.

high-low bias test, same as (check, marginal).

high order, pertaining to the weight or significance assigned to the digits of a number; e.g., in the number 123456, the highest order digit is one; the lowest order digit is six. One may refer to the three high order bits of a binary word, as another example. Clarified by (order (3)).

high-speed carry, same as (carry (2)).

high-speed printer, see (printer, high-speed).

high-speed reader, see (reader, high-speed).

hold, the function of retaining information in one storage device after also transferring it to another device. Contrasted with (clear).

Hollerith, a widely used system of encoding alphanumeric information onto cards, hence Hollerith cards is synonymous with punch cards. Such cards were first used in 1890 for the U.S. Census and were named after Herman Hollerith, their originator.

homostasis, the dynamic condition of a system wherein the input and output are balanced precisely, thus presenting an appearance of no change, hence a steady state.

hopper, same as (stacker, card).

horizontal system, see (system, horizontal).

housekeeping, pertaining to administrative or overhead operations or functions which are necessary in order to maintain control of a situation; e.g., for a computer program, housekeeping involves the setting up of constants and variables to be used in the program. Synonymous with (red tape).

housekeeping operation, see (operation, housekeeping).

housekeeping routine, see (routine, housekeeping).

HSP, High-Speed Printer, see (printer, high-speed).

HSR, High-Speed Reader, see (reader, high-speed).

hub, a socket on a control panel or plugboard into which an electrical lead or plug wire may be connected in order to carry signals, particularly to distribute the signals over many other wires.

hunting, a continuous attempt on the part of an automatically controlled system to seek a desired equilibrium condition. The system usually contains a standard, a method of determining deviation from this standard and a method of influencing the system such that the difference between the standard and the state of the system is brought to zero. Clarified by (servomechanism (2)).

hysteresis, (1) the lagging in the response of a unit of a system behind an increase or a decrease in the strength of a signal, (2) a phenomenom demonstrated by materials which make their behavior a function of the history of the environment to which they have been subjected.

I

IAL, International Algebraic Language, see (language, international algebraic).

identification, file, the coding required to identify each physical unit of the outputs of electronic data processing machine runs.

idle time, see (time, idle).

IDP, Integrated Data Processing, see (processing, see (processing, integrated data).

ignore, (1) a typewriter character indicating that no action whatsoever be taken; e.g., in teletype or flexowriter code, a character code consisting of holes punched in every hole position is an ignore character; this convention makes possible erasing any previously punched character. (2) An instruction requiring non-performance of what normally might be executed; i.e., not to be executed. This instruction should not be confused with a NO OP or Do Nothing instruction, since these generally refer to an instruction outside themselves.

illegal character, see (character, illegal).

image, an exact duplicate array of information or data stored in, or in transit to, a different medium.

image, card, a representation in storage of the holes punched in a card, in such a manner that the holes are represented by one binary digit and the unpunched spaces are represented by the other binary digit.

immediate access, see (access, immediate).

immediate address, see (address, immediate).

impedance, characteristic, (1) the ratio of voltage to current at every point along a transmission line on which there are no standing waves. (2) The square root of the product of the open and short circuit impedance of the line. When a transmission line is terminated in its characteristic impedance, energy is not reflected, but is fully absorbed in the terminating impedance.

inclusive or operator, see (operator, inclusive or).

impulse noise, see (noise, impulse).

incremental computer, see (computer, incremental).

index, a symbol or a number used to identify a particular quantity in an array of similar quantities; e.g., X5 is the fifth item in an array of X's.

index register, see (register, index).

index, word, an index based on the selection of words as used in a document, without giving thought to synonyms and more generic concepts related to the term selected.

index-word, a storage position or register the contents of which may be used to modify automatically the effective address of any given instruction.

indexed address, see (address, indexed).

indexing, coordinate, an indexing scheme by which descriptors may be correlated or combined to show any interrelationships desired for purposes of more precise information retrieval.

indexing, uniterm, a system of coordinate indexing which utilizes single terms, called Uniterms, to define a document uniquely. Related to (system, uniterm).

indicator, check, a device which displays or announces that an error has been made or that a checking operation has determined that a failure has occurred.

indicator, end of file, a device associated with each input and output unit that makes an end of file condition known to the routine and operator controlling the computer.

indicator, machine check, a protective device which will be turned on when certain conditions arise within the machine. The machine can be programed to stop or to run a separate correction routine or to ignore the condition.

indicator, overflow check, a device which is turned on by incorrect, or unplanned for, operations in the execution of an arithmetic instruction, particularly when an arithmetic operation produces a number too large for the system to handle.

indicator, read write check, a device incorporated in certain computers to indicate upon interrogation whether or not an error was made in reading or writing. The machine can be made to stop, re-try the operation or follow a special subroutine depending upon the result of the interrogation.

indicator, role, a code assigned to a keyword to indicate the role of the keyword; e.g., a keyword may be a noun, verb, adjective, or adverb; therefore, an indicator is used to identify the specific role of the keyword.

indicator, sign check, an error checking device, indicating no sign or improper signing of a field used for arithmetic processes. The machine can, upon interrogation be made to stop or enter into a correction routine.

indicators, the devices which register conditions, such as high or equal conditions resulting from a comparison of plus or minus conditions resulting from a computation. A sequence of operations within a procedure may be varied according to the position of an indicator.

indirect address, see (address, indirect).

information, a collection of facts or other data especially as derived from the processing of data. Related to (data).

information processing, see (processing, information).

information requirements, see (requirements, information).

information retrieval, see (retrieval, information).

information retrieval system, see (system, information retrieval).

information system, see (system, information).

information theory, see (theory, information).

information word, see (word, information).

inherent error, same as (error, inherited).

inherited error, see (error, inherited).

inhibiting input, see (input, inhibiting).

inhibiting signal, see (signal, inhibiting).

initialize, (1) to set various counters, switches and addresses to zero or other starting values, at the beginning of, or at the prescribed points in a computer routine; (2) used as an aid to recovery and restart during a long computer run.

in-line processing, same as (on-line (2)).

in-line subroutine, see (subroutine, in-line).

input, (1) information or data transfered or to be transfered from an external storage medium into the internal storage of the computer, (2) describing the routines which direct input as defined in (1) or the devices from which such information is available to the computer. (3) the device or collective set of devices necessary for input as defined in (1).

input area, same as (block, input (1)).

input block, see (block, input).

input device, see (device, input).

input equipment, see (equipment, input).

input, inhibiting, a gate input which, if in its prescribed state, prevents any output which might otherwise occur.

input magazine, see (magazine, input).

input-output, a general term for the equipment used to communicate with a computer and the data involved in the communication. Synonymous with (I/O).

input-output limited, pertaining to a system or condition in which the time for input and output operation exceeds other operations.

input routine, see (routine, input).

input stacker, same as (magazine, input).

inquiry, a technique whereby the interrogation of the contents of a computer's storage may be initiated at a keyboard.

inquiry station, see (station, inquiry).

installation date, see (date, installation).

instruction, (1) a set of characters which defines an operation together with one or more addresses, or no address, and which, as a unit, causes the computer to perform the operation on the indicated quantities. The term instruction is preferable to the terms command and order; command is reserved for a specific portion of the instruction word; i.e., the part which specifies the operation which is to be performed, order is reserved for the ordering of the characters, implying sequence, or the order of the interpolation, or the order of the differential equation. Related to (code (1)). (2) The operation or command to be executed by a computer, together with associated addresses, tags and indices.

instruction. alphanumeric, the name given to instructions which can be used equally well with alphabetic or numeric kinds of fields of data.

instruction area, see (area, instruction).

instruction, branch, an instruction to a computer that enables the programer to instruct the computer to choose between alternative sub-programs depending upon the conditions determined by the computer during the execution of the program. Synonymous with (transfer instruction).

instruction, breakpoint, (1) an instruction which will cause a computer to stop or to transfer control in some standard fashion to a supervisory routine which can monitor the progress of the interrupted program; (2) an instruction which, if some specified switch is set, will cause the computer to stop or take other special action.

instruction, check indicator, an instruction which directs that a signal device which is turned on to call operators' attention to the fact that there is some discrepancy in the instruction now in use.

instruction code, see (code, instruction).

instruction, conditional breakpoint, a conditional jump instruction which, if some specified switch is set or situation exists, will cause the computer to stop; after which either the routine may be continued as coded, or a jump may be forced.

instruction, constant, an instruction not intended to be executed as an instruction, written in the form of a constant. Related to (instruction, dummy).

instruction counter, same as (counter, location (2)).

instruction, dummy, an artifical instruction or address inserted in a list to serve a purpose other than the execution as an instruction. Related to (instruction, constant).

instruction, four address, a machine instruction usually consisting of the addresses of two operands, the address for storing the result, the address of the next instruction, the command to be executed, and miscellaneous indices. Synonymous with (three plus one address instruction).

instruction, macro, (1) an instruction consisting of a sequence of micro instructions which are inserted into the object routine for performing a specific operation, (2) the more powerful instructions which combine several operations in one instruction.

instruction, micro, a small, single, short, add, shift or delete type of command.

instruction, multiple address, an instruction consisting of an operation code and two or more addresses. Usually specified as a two-address, three-address, or four-address instruction.

instruction, no address, an instruction specifying an operation which the computer can perform without having to refer to its storage unit.

instruction, no-op, (1) an instruction which specifically instructs the computer to do nothing but process the next instruction in sequence. (2) A blank instruction. (3) A skip instruction. (4) A waste instruction. Synonymous with (waste instruction and skip).

instruction, one address, an instruction consisting of an operation and exactly one address. The instruction code of a signal address computer may include both zero- and multi address instructions as special cases. Related to (address, one).

instruction, one plus one address, an instruction containing two or four addresses one of which specifies explicitly the location of the next instruction to be executed. It is usually used on computers whose storage has a latency factor; e.g., a drum computer.

instruction, pseudo, (1) a symbolic representation in a compiler or interpreter. (2) A group of characters having the same general form as a computer instruction, but never executed by the computer as an actual instruction. Synonymous with (quasi instruction).

instruction, quasi, same as (instruction, pseudo).

instruction register, same as (register, program (2)).

instruction repertory, see (repertory, instruction).

instruction, skip, an instruction having no effect other than directing the processor to proceed to another instruction designated in the storage portion. Synonymous with (skip) and (instruction, no-op (3)).

instruction, symbolic, an instruction in an assembly language directly translatable into a machine code.

instruction time, see (time, instruction).

instruction, three plus one address, same as (instruction, four address).

instruction, transfer, same as (instruction, branch).

instruction, two, three or four address, an instruction consisting of an operation and 2, 3, or 4 addresses respectively. The addresses may specify the location of operands, results, or other instructions.

instruction, waste, same as (instruction, no-op (4)).

instruction, zero address, an instruction consisting of an operation which does not require the designation of an address in the usual sense; e.g., the instruction, "shift left 0003," has in its normal address position the amount of the shift desired.

integrated data processing, see (processing, integrated data).

integrator, a device whose output is proportional to the integral of the input variable with respect to time.

intelligence, artificial, the study of computer and related techniques to supplement the intellectual capabilities of man. As man has invented and used tools to increase his physical powers, he now is beginning to use artifical intelligence to increase his mental powers. In a more restricted sense, the study of techniques for more effective use of digital computers by improved programing techniques.

interface, a common boundary between automatic data processing systems or parts of a single system.

interfix, a technique which allows the relationships of key words in an item or document to be described so that very specific inquiries can be answered without false retrievals due to crosstalk.

interlace, to assign successive storage locations; e.g., on a magnetic drum, usually for the purpose of reducing access time.

interlock, to arrange the control of machines or devices so that their operation is interdependent in order to assure their proper coordination.

internal arithmetic, see (arithmetic, internal).

internal memory, same as (storage, internal).

internal storage, see (storage, internal).

internally stored program, see (program, internally stored).

international algebraic language, see (language, international algebraic).

interpret, (1) to print on a punch card the information punched in that card, (2) to translate non-machine language into machine language instructions.

interpreter, (1) a punch card machine which will take a punch card with no printing on it, read the information in the punched holes, and print a translation in characters in specified rows and columns on the card. (2) An executive routine which, as the computation progresses, translates a stored program expressed in some machine like pseudo code into machine code and performs the indicated operations, by means of subroutines, as they are translated. An interpreter is essentially a closed subroutine which operates successively on an indefinitely long sequence of program parameters, the pseudo instructions and operands. It may usually be entered as a closed subroutine and left by a pseudo-code exit instruction.

interpretive code, same as (routine, interpretive).

interpretive programing, see (programing, interpretive).

interpretive routine, see (routine, interpretive).

inter-record gap, see (gap, inter-record).

interrupt, to temporarily disrupt the normal operation of a routine by a special signal from the computer. Usually the normal operation can be resumed from that point at a later time.

interstage punching, see (punching, interstage).

inverter, a circuit which takes in a positive pulse and puts out a negative one, or takes in a negative pulse and puts out a positive one. The physical meaning of positive and negative depends on the specific circuit and the conventions established for it.

I/O, the abbrevation for input/output. Synonymous with (input-output).

item, (1) a set of one or more fields containing related information, (2) a unit of correlated information relating to a single person or object, (3) the contents of a single message.

item advance, see (advance, item).

item design, see (design, item).

item size, see (size, item).

iterative, describing a procedure or process which repeatedly executes a series of operations until some condition is satisfied. An iterative procedure can be implemented by a loop in a routine.

iterative process, see (process, iterative).

J

jam, card, a pile-up of cards in a machine.

jump, same as (transfer (4)).

jump, conditional, same as (transfer, conditional).

jump, unconditional, same as (transfer, unconditional).

K

key, (1) a group of characters which identifies or is part of a record or item, thus any entry in a record or item can be used as a key for collating or sorting purposes. (2) A marked lever manually operated for copying a character; e.g., a typewriter, paper tape perforator, card punch, manual keyboard,

digitizer or manual word generator. (3) A lever or switch on a computer console for the purpose of manually altering computer action.

keyboard entry, see (entry, keyboard).

keypunch, (1) a special device to record information in cards or tape by punching holes in the cards or tape to represent letters, digits, and special characters; (2) to operate a device for punching holes in cards or tape.

key-verify, to use the punch card machine known as a verifier, which has a keyboard, to make sure that the information supposed to be punched in a punch card has actually been properly punched. The machine signals when the punched hole and the depressed key disagree.

kilocycle, a thousand cycles per second, or 10^3 cycles per second. Clarified by (megacycle, gigacycle and teracycle).

kilomegacycle, same as (gigacycle).

L

label, a set of symbols used to identify or describe an item, record, message, or file. Occasionally it may be the same as the address in storage.

lacing, extra multiple punching in a card column to signify the end of a specific card run. The term is derived from the lace work appearance of the card.

lag, a relative measure of the time delay between two events, states, or mechanisms.

language, a system for representing and communicating information or data between people, or between people and machines. Such a system consists of a carefully defined set of characters and rules for combining them into larger units, such as words or expressions, and rules for word arrangement or usage to achieve specific meanings.

language, algorithmic, an arithmetic language by which numerical procedures may be precisely presented to a computer in a standard form. The language is intended not only as a means of directly presenting any numerical procedure to any suitable computer for which a compiler exists, but also as a means of communicating numerical procedures among individuals. The language itself is the result of international cooperation to obtain a standardized algorithmic language. The International Algebraic Language is the forerunner of ALGOL. Synonymous with (ALGOL) and clarified by (language, international algebraic).

language, artificial, a language specifically designed for ease of communication in a particular area of endeavor, but one that is not yet natural to that area. This is contrasted with a natural language which has evolved through long usage.

language, common machine, a machine sensible information representation which is common to a related group of data processing machines.

language, common business oriented, a specific language by which business data processing procedures may be precisely described in a standard form. The language is intended not only as a means for directly presenting any business program to any suitable computer, for which a compiler exists, but also as a means of communicating such procedures among individuals. Synonymous with (COBOL).

language, international algebraic, the forerunner of (ALGOL). Synonymous with (IAL) and clarified by (language, algorithmic).

language, machine, same as (language, machine oriented), and related to (language, object).

language, machine oriented, (1) a language designed for interpretation and use by a machine without translation. (2) A system for expressing information which is intelligible to a specific machine; e.g., a computer or class of computers. Such a language may include instructions which define and direct machine operations, and information to be recorded by or acted upon by these machine operations. (3) The set of instructions expressed in the number system basic to a computer, together with symbolic operation codes with absolute addresses, relative addresses, or symbolic addresses. Synonymous with (language, machine); clarified by (language); related to (language, object); and contrasted with (language, problem oriented).

language, object, a language which is the output of an automatic coding routine. Usually object language and machine language are the same; however, a series of steps in an automatic coding system may involve the object language of one step serving as a source language for the next step and so forth.

language, problem oriented, (1) a language designed for convenience of program specification in a general problem area rather than for easy conversion to machine instruction code. The components of such a language may bear little resemblance to machine instructions. (2) A machine independent language where one needs only to state the problem, not the how of solution. Related to (generators, program) and contrasted with (language, procedure oriented).

language, procedure oriented, a machine independent language which describes how the process of solving the problem is to be carried out; e.g., FORTRAN. Contrasted with (language, problem oriented).

language, program, a language which is used by programers to write computer routines.

language, source, the original form in which a program is prepared prior to processing by the machine.

language, target, the language into which some other language is to be properly translated.

latency time, see (time, latency).

leader, (1) a record which precedes a group of detail records, giving information about the group not present in the detail records; e.g., beginning of batch 17. (2) An unused or blank length of tape at the beginning of a reel of tape preceding the start of the recorded data.

leapfrog test, see (test, leapfrog).

length, block, the total number of records, words or characters contained in one block.

length, field, the physical extent of a field. On a punch card it refers to the number of columns. On a tape it refers to bit positions.

length, record, the number of characters necessary to contain all the information in a record.

length, register, the number of digits, characters, or bits which a register can store.

length, word, the number of characters in a machine word. In a given computer, the number may be constant or variable.

level, average effectiveness, a percentage figure determined by subtracting the total computer down time from the total performance period hours, and dividing the difference by the total performance period hours. For this computation, equipment down time can be measured by those intervals during the performance period between the time that the contractor or other person having maintenance responsibility is notified of equipment failure, and the time the equipment is returned to the user in proper operating condition.

library, (1) a collection of information available to a computer, usually on magnetic tapes; (2) a file of magnetic tapes.

library, routine, a collection of standard, proven routines and subroutines by which problems and parts of problems may be solved.

library, subroutine, a set of standard and proven subroutines which is kept on file for use at any time.

line, acoustic delay, a delay line using a medium providing acoustic delay; such as, mercury or quartz delay lines. Synonymous with (sonic delay line) and related to (line, mercury delay).

line code, see (code, line).

line, delay, a device capable of retarding a pulse of energy between input and output, based on the properties of materials, or circuit parameters or mechanical devices. Examples of delay lines are material media such as mercury, in which sonic patterns may be propagated in time; lumped constant electrical lines; coaxial cables, transmission lines and recirculating magnetic drum loops. Related to (line, magnetic delay).

line, electric delay, a delay line using properties of lumped or distributed capacitive and inductive elements.

line, magnetic delay, a delay line using magnetic material; e.g., a drum channel used as a delay line, or combinations of cores and other components used as a delay line. Related to (line, delay).

line, magnetostrictive delay, a delay line which utilizes the physical principle of magnetostriction. Clarified by (magnetostriction).

line, mercury delay, a sonic or acoustic delay line in which mercury is used as the medium of sound transmission, with transducers on each end to permit conversion to and from electrical energy. Related to (line, acoustic delay).

line printer, see (printer, line).

line, sonic delay, same as (line, acoustic delay).

linear programing, see (programing, linear).

linkage, a technique for providing interconnections between program runs or between routines.

linked subroutine, same as (subroutine, closed).

list, assembly, a printed list which is the by-product of an assembly procedure. It lists in logical instruction sequence all details of a routine showing the coded and symbolic notation next to the actual notations established by the assembly procedure. This listing is highly useful in the debugging of a routine.

list, push down, a list of items where the last item entered is the first item of the list, and the relative position of the other items is pushed back one.

list, push up, a list of items where each item is entered at the end of the list, and the other items maintain their same relative position in the list.

load, (1) to put data into a register or storage; (2) to put a magnetic tape onto a tape drive, or to put cards into a card reader.

load-and-go, refers to an automatic coding procedure which not only compiles the program, creating machine language, but also proceeds to execute the created program. Load and go procedures are usually part of a monitor.

load point, see (point, load).

loading routine, see (routine, loading).

location, a storage position in the main internal storage which can store one computer word and which is usually identified by an address.

location, bit, a storage position on a record capable of storing one bit.

location counter, see (counter, location).

log, a record of everything pertinent to a machine run including: identification of the machine run, record of alteration switch settings, identification of input and output tapes, copy of manual key-ins, identification of all stops, and a record of action taken on all stops.

logger, a device which automatically records physical processes and events, usually chronologically.

logic, (1) the science dealing with the criteria or formal principles of reasoning and thought. (2) The systematic scheme which defines the interactions of signals in the design of an automatic data processing system. (3) The basic principles and application of truth tables and interconnection between logical elements required for arithmetic computation in an automatic data processing system. Related to (logic, symbolic).

logic, formal, a branch of logic that deals with the study of the structure and forms of valid argument without regard to content.

logic, mathematical, same as (logic, symbolic (2)).

logic, symbolic, (1) the study of formal logic and mathematics by means of a special written language which seeks to avoid the ambiguity and inadequacy of ordinary language. (2) The mathematical concepts, techniques and languages as used in 1, whatever their particular application or context. Synonymous with (mathematical logic) and related to (logic).

logical connectives, see (connectives, logical).

logical decision, see (decision, logical).

logical design, see (design, logical).

logical diagram, see (diagram, logical).

logical difference, see (difference, logical).
logical element, see (element, logical).
logical flow chart, see (chart, logical flow).
logical multiply, same as (operator, and).
logical operation, see (operation, logical).
logical operator, same as (operator (1)).
logical shift, same as (shift, cyclic).
logical sum, see (sum, logical).
logical symbol, see (symbol, logical).
look up table, same as (table), and not to be confused with the verb form (table look up).
loop, (1) a self-contained series of instructions in which the last instruction can modify and repeat itself until a terminal condition is reached. The productive instructions in the loop generally manipulate the operands, while bookkeeping instructions modify the productive instructions, and keep count of the number of repetitions. A loop may contain any number of conditions for termination. The equivalent of a loop can be achieved by the technique of straight line coding, whereby the repetition of productive and bookkeeping operations is accomplished by explicitly writing the instructions for each repetition. Synonymous with (cycle (1)). (2) A communications circuit between two private subscribers or between a subscriber and the local switching center.
loop, closed, pertaining to a system with feedback type of control, such that the output is used to modify the input.
loop, open, pertaining to a control system in which there is no self correcting action for misses of the desired operational condition, as there is in a closed loop system.
loop, rapid access, a small section of storage, particularly in drum, tape or disk storage units, which has much faster access than the remainder of the storage. Synonymous with (revolver).
low-order, pertaining to the weight or significance assigned to the digits of a number; e.g., in the number 123456, the low order digit is six. One may refer to the three low-order bits of a binary word, as another example. Clarified by (order (3)).
LPM, Lines Per Minute.

M

machine, accounting, same as (tabulator).
machine address, see (address, machine).
machine check indicator, see (indicator, machine check).
machine code, same as (code, computer (1)).
machine, data processing, a general name for a machine which can store and process numeric and alphabetic information. Related to (computer, analog; computer, digital); and (equipment, automatic data processing).
machine, electrical accounting, the set of conventional punch card equipment including sorters, collators and tabulators. Synonymous with (EAM) and clarified by (equipment, tabulating).
machine, electronic data processing, same as (equipment, automatic data processing).
machine error, see (error, machine).
machine language, see (language, machine).
machine language code, see (code, machine language).
machine operator, see (operator, machine).
machine oriented language, see (language, machine oriented).
machine run, see (run, machine).
machine, self organizing, a class of machines which may be characterized loosely as containing a variable network in which the elements are organized by the machine itself, without external intervention, to meet criteria of successful operation. Synonymous with (self organizing machine).
machine-sensible, pertaining to information in a form which can be read by a specific machine.
machine translation, see (translation, machine).
machine, turing, a mathematical abstraction of a device which operates to read from, write on and move an infinite tape, thereby providing a model for computer like procedures. The behavior of a Turing machine is specified by listing an alphabet; i.e., collection of symbols read and written, a set of internal states, and a mapping of an alphabet and internal states which determines what the symbol written and tape motion will be, and also what internal state will follow when the machine is in a given internal state and reads a given symbol.
machine, universal turing, a Turing machine that can simulate any other Turing machine.
machine word, see (word, machine).
macro instruction, see (instruction, macro).
magazine, input, the card-feed magazine in a reader, or read-punch unit. Synonymous with (input stacker).
magazine, output, a mechanism that accumulates cards after they have passed through a machine. Synonymous with (output stacker).
magnetic core storage, see (storage, magnetic core).
magnetic delay line, see (line, magnetic delay).
magnetic disk, see (disk, magnetic).
magnetic disk storage, see (storage, magnetic disk).
magnetic drum, see (drum, magnetic).
magnetic drum storage, see (storage, magnetic drum).
magnetic shift register, see (register, magnetic shift).
magnetic storage, see (storage, magnetic).
magnetic tape, see (tape, magnetic).
magnetic tape reader, see (reader, magnetic tape).
magnetic tape storage, see (storage, magnetic tape).
magnetic tape unit, see (unit, magnetic tape).
magnetic wire, see (wire, magnetic).
magnetostriction, a phenomenon wherein certain materials increase in length in the direction of the magnetic field when subjected to such a field, and restore to their original length when demagnetized.
magnetostrictive delay line, see (line, magnetostrictive delay).
main frame, see (frame, main).
main storage, see (storage, main).
management information system, see (system, management information).
maintenance, file, the periodic modification of a file to incorporate changes which occurred during a given period.

maintenance, preventive, the maintenance of a computer system which attempts to keep equipment in top operating condition and to preclude failures during production runs.

maintenance, remedial, the maintenance performed by the contractor following equipment failure; therefore, is performed as required, on an unscheduled basis.

major cycle, see (cycle, major).

malfunction, a failure in the operation of the hardware of a computer.

malfunction routine, same as (routine, diagnostic).

malfunction, program sensitive, a malfunction which occurs only when some unusual combination of program steps occur.

manipulated variable, see (variable, manipulated).

manual control, see (control, manual).

map, to transform information from one form to another.

marginal check, see (check, marginal).

marginal test, same as (check, marginal).

mark, a sign or symbol used to signify or indicate an event in time or space; e.g., end of word or message mark, a file mark, a drum mark, an end of tape mark.

mark, drum, a character used to signify the end of a record on a drum.

mark, end, an indicator to signal the end of a word or the end of a unit of data.

mark, group, a special character used to designate the end of a record in storage for a write instruction.

mark, record, a special character used in some computers either to limit the number of characters in a data transfer, or to separate blocked or grouped records in tape.

mark, record storage, a special character which appears only in the record storage unit of the card reader to limit the length of the record read into storage.

mark sensing, see (sensing, mark).

mark, segment, a special character written on tape to separate one section of a tape file from another.

mark, storage, the name given to a point location which defines the character space immediately to the left of the most significant character in accumulator storage. An example would be:

a	7	4	6	7	4	8	9

in which the letter "a" would be the storage mark.

mark, tape, the special character that is written on tape to signify the physical end of the recording on tape.

mask, same as (filter).

masking, (1) the process of extracting a non-word group or a field of characters from a word or a string of words, (2) the process of setting internal program controls to prevent transfers which otherwise would occur upon setting of internal machine latches.

master card, see (card, master).

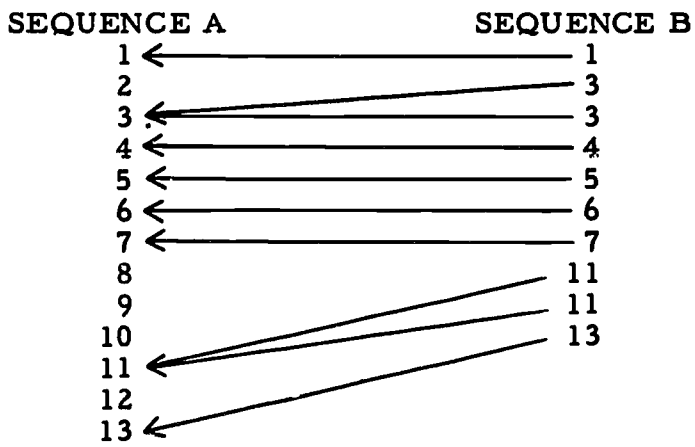
master control, see (control, master).

master data, see (data, master).

master file, see (file, master).

master instruction tape, see (tape, master instruction).

match, a data processing operation similar to a merge, except that instead of producing a sequence of items made up from the input, sequences are matched against each other on the basis of some key. The following is a schematic of a two-item match:



mathematical logic, same as (logic, symbolic (2)).

mathematical check, see (check, mathematical).

mathematical model, see (model, mathematical).

matrix, (1) an array of quantities in a prescribed form; in mathematics, usually capable of being subject to a mathematical operation by means of an operator or another matrix according to prescribed rules. (2) An array of coupled circuit elements; e.g., diodes, wires, magnetic cores, and relays, which are capable of performing a specific function; such as, the conversion from one numerical system to another. The elements are usually arranged in rows and columns. Thus a matrix is a particular type of encoder or decoder. Clarified by (encoder) and (decoder).

matrix printer, same as (printer, wire).

matrix, semantic, a graphical device for plotting in a standard conventional form whatever precise elements of meaning have been ascertained from the semantic analysis of a concept.

mechanical differential analyzer, see (analyzer, mechanical differential).

mechanical replacement, see (replacement, mechanical).

mechanical translation, see (translation, mechanical).

medium, the physical substance upon which data is recorded; e. g., magnetic tape, punch cards and paper.

megabit, one million binary bits.

megacycle, a million cycles per second, 10^6 cycles per second.

memory, same as (storage).

memory capacity, same as (capacity, storage).

memory dump, same as (dump, storage).

memory, dynamic, same as (storage, dynamic).

memory, external, same as (storage, external).

memory, internal, same as (storage, internal).

memory print-out, same as (dump, storage).

memory, random access, same as (storage, random access).

memory register, same as (register, storage).

mercury delay line, see (line, mercury delay).
mercury storage, see (storage, mercury).
mercury tank, see (tank, mercury).
merge, to combine items into one sequenced file from two or more similarly sequenced files without changing the order of the items.
message, (1) a group of words, variable in length, transported as a unit; (2) a transported item of information.
message exchange, see (exchange, message).
message routing, see (routing, message).
method, monte carlo, a trial and error method of repeated calculations to discover the best solution of a problem. Often used when a great number of variables are present, with inter-relationships so extremely complex as to forestall straightforward analytical handling.
micro code, see (code, micro).
micro instruction, see (instruction, micro).
micro programing, see (programing, micro).
microprogram, (1) a program of analytic instructions which the programer intends to construct from the basic subcommands of a digital computer, (2) a sequence of pseudo commands which will be translated by hardware into machine subcommands, (3) a means of building various analytic instructions as needed from the subcommand structure of a computer, (4) a plan for obtaining maximum utilization of the abilities of a digital computer by efficient use of the subcommands of the machine.
microsecond, one millionth of a second, 10^{-6} seconds, abbreviated microsec.
millimicrosecond, same as (nanosecond).
millisecond, one thousandth of a second, 10^{-3} seconds, abbreviated msec. or ms.
minimum access code, see (code, minimum access).
minimum access programing, see (programing, minimum access).
minimum access routine, see (routine, minimum access).
minimum latency code, same as (code, minimum access).
minimum latency programing, same as (programing, minimum access).
minimum latency routine, same as (routine, minimum access).
minor cycle, see (cycle, minor).
minuend, the quantity from which another quantity is subtracted or is to be subtracted.
minus zone, see (zone, minus).
mistake, a human failing; e.g., faulty arithmetic, use of incorrect formula, or incorrect instructions. Mistakes are sometimes called gross errors to distinguish from rounding and truncation errors. Thus, computers malfunction and humans make mistakes. Computers do not make mistakes and humans do not malfunction, in the strict sense of the word. Contrasted with (error (2)).
MIT, Master Instruction Tape, see (tape, master instruction).
mixed base notation, same as (notation, mixed radix).
mixed base number, same as (number, mixed radix).
mixed radix notation, see (notation, mixed radix).
mixed radix number, see (number, mixed radix).
mnemonic, pertaining to the assisting, or intending to assist, human memory; thus a mnemonic term, usually an abbreviation, that is easy to remember; e.g., mpy for multiply and acc for accumulator.
mnemonic operation code, see (code, mnemonic operation).
mode, (1) a computer system of data representation; e.g., the binary mode. (2) A selected mode of computer operation.
mode, noisy, a floating point arithmetic procedure associated with normalization in which "1" bits, rather than "0" bits, are introduced in the low order bit position during the left shift.
model, mathematical, the general characterization of a process, object, or concept, in terms of mathematics, which enables the relatively simple manipulation of variables to be accomplished in order to determine how the process, object, or concept would behave in different situations.
modifier, a quantity used to alter the normal interpretation and execution of an instruction; e.g., an index tag or indirect address tag.
modify, (1) to alter a portion of an instruction so its interpretation and execution will be other than normal. The modification may permanently change the instruction or leave it unchanged and affect only the current execution. The most frequent modification is that of the effective address through use of index registers. (2) To alter a subroutine according to a defined parameter.
modulation code, see (code, modulation).
modulator, a device which varies a repetitive phenomenon in accordance with some predetermined scheme usually introduced as a signal. Clarified by (code, modulation and demodulator).
module, (1) an interchangeable plug-in item containing components, (2) an incremental block of storage or other building block for expanding the computer capacity.
modulo N check, see (check, modulo N).
monitor, to supervise and verify the correct operation of a program during its execution, usually by means of a diagnostic routine used from time to time to answer questions about the program.
monitor routine, same as (routine, executive).
monitor system, same as (system, operating).
monte carlo method, see (method, monte carlo).
multi-address, same as (address, multiple).
multi-precision arithmetic, see (arithmetic, multi-precision).
multi-aspect, pertaining to searches or systems which permit more than one aspect, or facet, of information to be used in combination, one with the other to effect identifying and selecting operations.
multiple address, same as (address, multiple).
multiple address code, see (code, multiple address).
multiple address instruction, see (instruction, multiple address).
multiple length number, see (number, multiple length).

multiple programing, see (programing, multiple).

multiple punching, see (punching, multiple).

multiplex, the process of transferring data from several storage devices operating at relatively low transfer rates to one storage device operating at a high transfer rate in such a manner that the high-speed device is not obliged to wait for the low-speed devices.

multiplexing, (1) the transmission of a number of different messages simultaneously over a single circuit. (2) Utilizing a single device for several similar purposes or using several devices for the same purpose; e.g., a duplexed communications channel carrying two messages simultaneously.

multiplication time, see (time, multiplication).

multiply, logical, same as (operator, and).

multiprocessor, a machine with multiple arithmetic and logic units for simultaneous use.

multiprograming, a technique for handling numerous routines or programs simultaneously by means of an interweaving process.

N

nanosecond, one thousandth of a millionth of a second, 10^{-9} seconds. Synonymous with (millimicrosecond).

nest, (1) to embed a subroutine or block of data into a larger routine or block of data, (2) to evaluate an nth degree polynomial by a particular algorithm which uses (n-1) multiply operations and (n-1) add operations in succession.

network, analog, a circuit or circuits which represent(s) physical variables in such a manner as to permit the expression and solution of mathematical relationships between the variables or permits the solution directly by electric or electronic means.

network analyzer, see (analyzer, network).

network calculator, same as (analyzer, network).

neutral zone, see (zone, neutral).

ninety (90) column card, see (card, ninety (90) column).

no address instruction, see (instruction, no address).

no charge machine fault time, see (time, no charge machine fault).

no charge non machine fault time, see (time, no charge non machine fault).

noise, the meaningless extra bits or words which must be ignored or removed from the data at the time the data is used. Related to (drops, false).

noise, broadband (white), the thermal noise which is uniformally distributed across the frequency spectrum at a wide range of energy levels.

noise, impulse, a pulse appearing at the output of a circuit which was not transmitted from the originating input to the circuit. These pulses usually are induced from circuit functioning or from sources outside the circuit and its associated input-output equipment.

noisy mode, see (mode, noisy).

non arithmetic shift, same as (shift, cyclic).

non destructive read, see (read, non destructive).

non erasable storage, see (storage, non erasable).

non scheduled maintenance time, see (time, non scheduled maintenance).

non volatile storage, see (storage, non volatile).

no-op instruction, see (instruction, no-op).

normal stage punching, see (punching, normal stage).

normalize, (1) in programing to adjust the exponent and fraction of a floating point quantity so that the fraction lies in the prescribed normal standard, range. (2) In mathematical operations to reduce a set of symbols or numbers to a normal or standard form. Synonymous with (standardize).

notation, (1) the act, process, or method of representing facts or quantities by a system or set of marks, signs, figures, or characters. (2) A system of such symbols or abbreviations used to express technical facts or quantities; as mathematical notation. (3) An annotation; note.

notation, base, same as (notation, radix).

notation, binary, a number system written to the base two notation.

notation, binary coded decimal, a method of representing each figure in a decimal number by a four figured binary number.

notation, biquinary, a method for expressing a quantity less than ten, using two figures, wherein the first (left) figure is of radix two and the second (right) figure is of radix five.

notation, coded decimal, a method of representing each figure in a decimal number by a character or a group of characters.

notation, mixed base, same as (notation, mixed radix).

notation, mixed radix, a method of expressing a quantity, using two or more characters, where each character is of a different radix.

notation, polyvalent, a method for describing salient characteristics, in condensed form, using two or more characters, where each character or group of characters represents one of the characteristics.

notation, positional, a method for expressing a quantity, using two or more figures, wherein the successive right to left figures are to be interpreted as coefficients of ascending integer powers of the radix. Synonymous with (positional number).

notation, radix, (1) an annotation consisting of a decimal number, in parentheses, written as a subscript suffix to a number, its decimal value indicating the radix of the number; e.g., $11_{(2)}$ indicates the number 11 is in the radix of two; $11_{(8)}$ indicates the number 11 is in the radix of eight. (2) A number written without its radix notation is assumed to be in the radix of ten. Synonymous with (base notation).

notation, symbolic, a method of representing a storage location by one or more figures.

null, (1) an absence of information, as contrasted with zero or blank for the presence of no-information; (2) zero; (3) pertaining to no deflection from a center or end position.

number, (1) the, or a total, aggregate, or amount of units. (2) A figure or word, or a group of figures or words, representing graphically an arithmetical sum; a numeral, as the number

45. Clarified by (systems, number). (3) A numeral by which a thing is designated in a series; as a pulse number. (4) A single member of a series designated by consecutive numerals; as, a part number. (5) A character, or a group of characters, uniquely identifying of describing an article, process, condition, document, or class; as, a 6SN7 tube. (6) To count; enumerate. (7) To distinguish by a number.

number, base, same as (radix).

number, binary, a number, usually consisting of more than one figure, representing a sum, in which the individual quantity represented by each figure is based on a radix of two. The figures used are 0 and 1.

number, binary coded decimal, a number usually consisting of successive groups of figures, in which each group of four figures is a binary number that represents but does not necessarily equal arithmetically, a particular figure in an associated decimal number; e.g., if the three rightmost figures of a decimal number are 262, the three rightmost figure groups of the binary coded decimal number might be 0010, 0110, and 0010.

number, biquinary, (1) a number, consisting of a pair of figures representing a sum, in which the quantity represented by the left figure is based on the radix two, and the quantity represented by the right figure is based on the radix five. The figures 0 and 1 are used for the left figure, and 0,1,2,3, and 4 are used for the right figure. (2) A number consisting of successive pairs of figures, representing a sum, in which the quantity represented by each pair of figures is based on a radix of ten.

number, biquinary coded decimal, a number usually consisting of successive pairs of figures, in which each pair is a biquinary number; e.g., if the figures of a decimal number are 3671, the biquinary coded decimal number would be 03 11 12 01.

number, call, (1) a group of characters identifying a subroutine and containing: (a) information concerning parameters to be inserted in the subroutine, (b) information to be used in generating the subroutine, or (c) information related to the operands. (2) A call word, if the quantity of characters in the call number is equal to the length of a computer word.

number, check, a number composed of one or more digits and used to detect equipment malfunctions in data transfer operations. If a check number consists of only one digit, it is synonymous with check digit. Related to (digit, check).

number, coded decimal, a number consisting of successive characters or a group of characters in which each character or group of characters usually represents a specific figure in an associated decimal number; e.g., if the figures of a decimal number are 45, the coded decimal number might be represented as GQ, or LLZZ, or 1101 0110.

number, decimal, a number, usually of more than one figure, representing a sum, in which the quantity represented by each figure is based on the radix of ten. The figures used are 0,1,2,3,4,5,6,7,8, and 9.

number, double length, a number having twice as many figures as are normally handled in a particular device. Synonymous with (double precision number).

number, double precision, same as (number, double length).

number, duodecimal, a number, consisting of successive characters, representing a sum, in which the individual quantity represented by each character is based on a radix of twelve. The characters used are 0,1,2,3,4,5, 6,7,8,9,T (for ten), and E (for eleven). Related to (systems, number).

number, hexadecimal, same as (number, sexadecimal).

number, mixed base, same as (number, mixed radix).

number, mixed radix, a number consisting of two or more characters, representing a sum, in which the quantity represented by each character is based on a different radix. Synonymous with (mixed base number).

number, multiple length, a number having two, three, or more times as many figures as are normally handled in a particular device.

number, octal, a number of one or more figures, representing a sum in which the quantity represented by each figure is based on a radix of eight. The figures used are 0,1,2,3, 4,5,6, and 7. Clarified by (octal).

number, operation, (1) a number designating the position of an operation, or its equivalent subroutine in the sequence of operations comprising a routine; (2) a number identifying each step in a program stated in symbolic code.

number, polyvalent, a number, consisting of several figures, used for description, wherein each figure represents one of the characteristics being described.

number, positional, same as (notation, positional).

number, radix, same as (radix).

number, read around, the number of times a specific spot, digit, or location in electrostatic storage may be consulted before spill over will cause a loss of information stored in surrounding spots. The surrounding information must be restored before the loss occurs.

number, self checking, a number with a suffix figure related to the figure(s) of the number, used to check the number after it has been transferred from one medium or device to another. Related to (bit, check); (check, modulo N); and (code, error detecting).

number, septinary, a number, usually of more than one figure, representing a sum, in which the quantity represented by each figure is based on a radix of seven. The figures used are 0,1,2,3,4,5, and 6.

number, sexidecimal, a number, usually of more than one figure, representing a sum in which the quantity represented by each figure is based on a radix of sixteen. Synonymous with (hexadecimal number).

number, symbolic, a numeral, used in writing routines, for referring to a specific storage

location; such numerals are converted to actual storage addresses in the final assembling of the program.

number systems, see (system, number).

numeral, a digit, or digits, normally used to represent a number.

numeric code, see (code, numeric).

numerical analysis, see (analysis, numerical).

numerical control, see (control, numerical).

n-way switch, same as (connector, variable (3)).

O

object language, see (language, object).

object program, see (program, object).

object routine, same as (program, object).

octal, pertaining to eight; usually describing a number system of base or radix eight; e.g., in octal notation, octal 214 is 2 times 64, plus 1 times 8, plus 4 times 1, and equals decimal 140. Octal 214 in binary-coded-octal is represented as 010, 001, 100; octal 214, as a straight binary number is written 10001100. Note that binary coded octal and straight binary differ only in the use of commas; in the example shown, the initial zero in the straight binary is dropped. Clarified by (number, octal).

octal digit, see (digit, octal).

octal number, see (number, octal).

octonary signalling, see (signalling, octonary).

odd-even check, same as (check, parity).

off-line, descriptive of a system and of the peripheral equipment or devices in a system in which the operation of peripheral equipment is not under the control of the central processing unit. Clarified by (equipment, off-line).

off-line equipment, see (equipment, off-line).

off-punch, a punch not properly positioned in a column of a card.

offset, the difference between the value or condition desired and that actually attained.

on-line, descriptive of a system and of the peripheral equipment or devices in a system in which the operation of such equipment is under control of the central processing unit, and in which information reflecting current activity is introduced into the data processing system as soon as it occurs. Thus, directly in-line with the main flow of transaction processing. Clarified by (equipment, on-line); synonymous with (in-line processing), and (on-line processing).

on-line processing, same as (on-line).

on-line data-reduction, see (data-reduction, on-line).

on the fly printer, see (printer, on the fly).

one address, see (address, one).

one address instruction, see (instruction, one address).

one level code, same as (code, absolute).

one plus one address, see (address, one plus one).

one plus one address instruction, see (instruction, one plus one address).

open-ended, the quality by which the addition of new terms, subject headings, or classifications does not disturb the pre-existing system.

open loop, see (loop, open).

open routine, see (routine, open).

open shop, see (shop, open).

open subroutine, see (subroutine, open).

operand, a quantity entering or arising in an instruction. An operand may be an argument, a result, a parameter, or an indication of the location of the next instruction, as opposed to the operation code or symbol itself. It may even be the address portion of an instruction.

operating ratio, see (ratio, operating).

operating system, see (system, operating).

operation, a defined action. The action specified by a single computer instruction or pseudo instruction.

operation, arithmetic, a computer operation in which the ordinary elementary arithmetic operations are performed on numerical quantities. Contrasted with (operation, logical).

operation, bookkeeping, a computer operation which does not directly contribute to the result; i.e., arithmetical, logical, and transfer operations used in modifying the address section of other instructions, in counting cycles and in rearranging data. Synonymous with (red tape operation).

operation code, see (code, operation).

operation, complete, an operation which includes obtaining the instruction, obtaining all the operands from storage, performing the operation, and returning the results to storage.

operation, computer, the electronic action resulting from an instruction. In general it is a computer manipulation required to secure results.

operation, fixed cycle, (1) a type of computer performance whereby a fixed amount of time is allocated to an operation. (2) a synchronous or clock-type arrangement within a computer in which events occur as a function of measured time. Contrasted with (operation, variable cycle).

operation, housekeeping, a general term for the operation which must be performed for a machine run usually before actual processing begins. Examples of housekeeping operations are: establishing controlling marks, setting up auxiliary storage units, reading in the first record for processing, initializing, set-up verification operations, and file identification.

operation, logical, (1) a logical or boolean operation on N-state variables which yields a single N-state variable; e.g., a comparison on the 3-state variables A and B, each represented by -, O, or +, which yields: - when A is less than B, O when A equals B, and + when A is greater than B. Specifically, operations such as AND, OR, and NOT on two-state variables which occur in the algebra of logic; i.e., Boolean algebra. (2) The operations of logical shifting, masking, and other non-arithmetic operations of a computer. Contrasted with (operation, arithmetic).

operation number, see (number, operation).

operation, parallel, the performance of several actions, usually of a similar nature, simultaneously through provision of individual similar or identical devices for each such action. Particularly flow or processing of information. Parallel operation is performed to save time

over serial operation. Parallel operation usually requires more equipment. Contrasted with (operation, serial).

operation, real time, the use of the computer as an element of a processing system in which the times of occurrence of data transmission are controlled by other portions of the system, or by physical events outside the system, and cannot be modified for convenience in computer programing. Such an operation either proceeds at the same speed as the events being simulated or at a sufficient speed to analyze or control external events happening concurrently.

operation, red tape, same as (operation, bookkeeping).

operation register, see (register, operation).

operation, scheduled, the periods of time during which the user plans to use specified equipment. Such a designation must be made a given number of hours in advance, provided however, that such scheduled hours of the operation may be modified after that time in the event of an emergency, or in the event that equipment failure creates a need for such rescheduling. Usually the foregoing is further modified in that during the performance period the hours rescheduled as a result of equipment failure usually are not considered as scheduled hours of operation in computing equipment effectiveness.

operation, sequential, the performance of actions one after the other in time. The actions referred to are of a large scale as opposed to the smaller scale operations referred to by the term serial operation. For an example of sequential operation consider Ax(BxC). The two multiplications indicated follow each other sequentially. However, the processing of the individual digits in each multiplication may be either parallel or serial.

operation, serial, the flow of information through a computer in time sequence using only one digit, word, line or channel at a time. Contrasted with (operation, parallel).

operation, single step, a method of operating an automatic computer manually in which a single instruction or part of an instruction is performed in response to a single operation of a manual control. This method is generally used for detecting mistakes.

operation, transfer, an operation which moves information from one storage location or one storage medium to another; e.g., read, record, copy, transmit, or exchange. Transfer is sometimes taken to refer specifically to movement between different storage media.

operation use time, see (time, operation use).

operation, variable cycle, a computer action in which any cycle of action or operation may be of a different time length. Such action is characteristic of an asynchronous computer. Contrasted with (operation, fixed cycle).

operations research, the use of analytic methods adopted from mathematics for solving operational problems. The objective is to provide management with a more logical basis for making sound predictions and decisions. Among the common scientific techniques used in operations research are the following: linear programing, probability theory, information theory, game theory, monte carlo method, and queuing theory. Synonymous with (O.R).

operator, (1) a mathematical symbol which represents a mathematical process to be performed on an associated operand, (2) The portion of an instruction which tells the machine what to do, (3) a machine operator.

operator, and, (1) a logical operator which has the property that if P is a statement and Q is a statement, then P AND Q is true if both statements are true, false if either is false or both are false. Truth is normally expressed by the value 1, falsity by 0. The AND operator is often represented by a centered dot (P·Q), by no sign (PQ), by an inverted "u" or logical product symbol (P∩Q), or by the letter "X" or multiplication symbol (PxQ). Note that the letters AND are capitalized to differentiate between the logical operator AND the word and in common usage. (2) The logical operation which makes use of the AND operator or logical product. Synonymous with (and; logical multiply) and clarified by (conjunction).

operator, exclusive or, a logical operator which has the property that if P and Q are two statements, then the statement P*Q, where the * is the Exclusive OR operator, is true if either P or Q, but not both are true, and false if P and Q are both false or both true, according to the following table, wherein the figure 1 signifies a binary digit or truth.

P	Q	P*Q	
0	0	0	(even)
0	1	1	(odd)
1	0	1	(odd)
1	1	0	(even)

Note that the Exclusive OR is the same as the Inclusive OR, except that the case with both inputs true yields no output; i.e., P*Q is true if P or Q are true, but not both. Primarily used in compare operations.

operator, inclusive or, a logical operator which has the property that P or Q is true, if P or Q or both is true; when the term OR is used alone, as in OR-gate, the Inclusive OR is usually implied.

operator, machine, the person who manipulates the computer controls, places information media into the input devices, removes the output and performs other related functions.

operator, or, a logical operator which has the property such that if P or Q are two statements, then the statement P OR Q is true or false varies according to the following table of possible combinations: Clarified by (disjunction).

P	Q	P or Q
False	True	True
True	False	True
True	True	True
False	False	False

optimize, to rearrange the instructions or data in storage so that a minimum number of time consuming jumps or transfers are required in the running of a program.

optimum code, see (code, optimum).

optimum programing, see (programing, optimum).

O. R. Operations Research, same as (operations research).

or circuit, same as (gate, or).

or gate see (gate, or).

or operator, see (operator, or).

order, (1) a defined successive arrangement of elements or events. This term is losing favor as a synonym for instructions, due to ambiguity. (2) To sequence or arrange in a series. (3) The weight or significance assigned to a digit position in a number. Clarified by (high order) and (low order).

origin, the absolute storage address in relative coding to which addresses in a region are referenced.

origination, data, the act of creating a record in a machine sensible form, directly or as a by-product of a human readable document.

output, (1) the information transferred from the internal storage of a computer to secondary or external storage, or to any device outside of the computer; (2) the routines which direct 1; (3) the device or collective set of devices necessary for 1; (4) to transfer from internal storage on to external media.

output area, same as (block, output (2)).

output block, see (block, output).

output device, see (device, output).

output equipment, see (equipment, output).

output magazine, see (magazine, output).

output stacker, same as (magazine, output).

overflow, (1) the condition which arises when the result of an arithmetic operation exceeds the capacity of the storage space alloted in a digital computer; (2) the digit arising from this condition if a mechanical or programed indicator is included, otherwise the digit may be lost.

overflow check indicator, see (indicator, overflow check).

overlay, a technique for bringing routines into high-speed storage from some other form of storage during processing, so that several routines will occupy the same storage locations at different times. Overlay is used when the total storage requirements for instructions exceed the available main storage.

overpunch, to add holes in a card column that already contains one or more holes. Synonymous with (zone punch) and related to (bits, zone (1)).

P

pack, to include several short items of information into one machine item or word by utilizing different sets of digits to specify each brief item.

packing density, see (density, packing).

padding, a technique used to fill out a block of information with dummy records.

panel, control, (1) an interconnection device, usually removable, which employs removable wires to control the operation of computing equipment. It is used on punch card machines, to carry out functions which are under control of the user. On computers it is used primarily to control input and output functions. (2) A device or component of some data processing machines, which permits the expression of instructions in a semi-fixed computer program by the insertion of pins, plugs, or wires into sockets, or hubs in the device, in a pattern to represent instructions, and thus making electrical interconnections which may be sensed by the data processing machine. Synonymous with (plugboard) and related to (pinboard).

panel, graphic, a master control panel which, pictorially and usually colorfully, traces the relationship of control equipment and the process operation. It permits an operator at a glance, to check on the operation of a far flung control system by noting dials, valves, scales, and lights.

paper tape, see (tape, paper).

paper tape readers, see (reader, paper tape).

parallel, (1) to handle simultaneously in separate facilities. (2) To operate on two or more parts of a word or item simultaneously. Contrasted with (serial).

parallel access, see (access, parallel).

parallel by character, the handling of all the characters of a machine word simultaneously in separate lines, channels or storage cells.

parallel computer, see (computer, parallel).

parallel operation, see (operation, parallel).

parallel processing, see (processing, parallel).

parallel running, see (running, parallel).

parallel storage, see (storage, parallel).

parallel transfer, see (transfer, parallel).

parameter, (1) a quantity in a subroutine, whose value specifies or partly specifies the process to be performed. It may be given different values when the subroutine is used in different main routines or in different parts of one main routine, but which usually remains unchanged throughout any one such use. Related to (parameter, program). (2) A quantity used in a generator to specify machine configuration, designate subroutines to be included, or otherwise to describe the desired routine to be generated. (3) A constant or a variable in mathematics, which remains constant during some calculation. (4) A definable characteristic of an item, device, or system.

parameter, preset, a parameter incorporated into a subroutine during input.

parameter, program, a parameter incorporated into a subroutine during computation. A program parameter frequently comprises a word stored relative to either the subroutine or the entry point and dealt with by the subroutine during each reference. It may be altered by the routine and/or may vary from one point of entry to another. Related to (parameter (1)).

partial carry, same as (carry (2)).

parity bit, see (bit, parity).

parity check, see (check, parity).

part address, see (address, part).

part-operation, the part in an instruction, that specifies the kind of arithmetical or logical operation to be performed, but not the address of the operands.

pass, a complete cycle of reading, processing and writing; i.e., a machine run.

patch, (1) a section of coding inserted into a routine to correct a mistake or alter the

routine. It is often not inserted into the actual sequence of the routine being corrected, but placed somewhere else, with an exit to the patch and a return to the routine provided. (2) To insert corrected coding.

pattern recognition, see (recognition, pattern).

PCM, Punch Card Machine, same as (machine, electrical accounting).

peek-a-boo system, see (system, peek-a-boo).

perforated tape, same as (tape, punch).

perforation rate, see (rate, perforation).

performance evaluation, see (evaluation, performance).

performance period, see (period, performance).

period, performance, a period of 30 consecutive calendar days during which a newly installed computer is being tested for acceptance by the U.S. Government. Such a period does not include equipment time used for data purification, file conversion, and similar preparatory operations or those hours of operation rescheduled as a result of equipment failure.

peripheral equipment, see (equipment, peripheral).

permanent storage, see (storage, permanent).

phase shift, see (shift, phase).

phone, data, a generic term to describe a family of devices available to facilitate data communication.

photomicrography, the process of making a larger photograph of a much smaller original.

picosecond, one thousandth of a nanosecond, or 10^{-12} seconds; abbreviated psec.

piezoelectric, a term applied to the phenomenon whereby certain materials, commonly crystalline, develop useful electrical pressures (voltages) when the material is subjected to variable mechanical pressures, strains, or stresses; conversely, the materials develop mechanical strains or stresses when electrical voltages are applied.

pinboard, a type of control panel which uses pins rather than wires to control the operation of a computer. On certain small computers which use pinboards, a program is changed by the operator removing one pinboard and inserting another. Related to (panel, control (2)).

ping-pong, the programing technique of using two magnetic tape units for multiple reel files and switching automatically between the two units until the complete file is processed.

plotter, a visual display or board in which a dependent variable is graphed by an automatically controlled pen or pencil as a function of one or more variables.

plotter, XY, a device used in conjunction with a computer to plot coordinate points in the form of a graph.

plug, program patching, a relatively small auxiliary plugboard patched with a specific variation of a portion of a program and designed to be plugged into a relatively larger plugboard patched with the main program.

plugboard, same as (panel, control (2)).

plus zone, see (zone, plus).

point, same as (point, radix).

point, binary, the radix point in a binary number system; i.e., the dot that marks the position between the integral and fractional, or units and halves in a binary number.

point, load, a preset point at which magnetic tape is initially positioned under the read-write head to start reading or writing.

point, radix, the dot that delineates the integer digits from the fractional digits of a number; specifically, the dot that delineates the digital position involving the zero exponent of the radix from the digital position involving the minus-one exponent of the radix. The radix point is often identified by the name of the system; e.g., binary point, octal point, or decimal point. In the writing of any number in any system, if no dot is included, the radix point is assumed to follow the rightmost digit. Synonymous with (point).

polyvalence, the property of being interrelated in several ways.

polyvalent notation, see (notation, polyvalent).

polyvalent number, see (number, polyvalent).

position, punch, the row position of a punched hole in a specific column of a punch card. In an 80-column punch card the rows are designated 0 to 9, X or Y; in a 90-column card the rows are designated 0, 1, 3, 5, 7, and 9.

positional notation, see (notation, positional).

positional number, same as (notation, positional).

positional representation, see (representation, positional).

positions, punching, the specific areas; i.e., row-column intersects, on a punch card where holes may be punched.

post, to enter an item on a record.

post edit, see (edit, post).

post mortem dump, see (dump, post mortem).

post mortem routine, see (routine, post mortem).

posting terminal digit, the arranging and recording of serial numbers of documents on the basis of the final digit of each of the numbers.

power dump, see (dump, power).

pre-edit, to edit the input data previous to the computation.

pre-store, (1) to set an initial value for the address of an operand or of a cycle index, (2) to restore, (3) to store a quantity in an available or convenient location before it is required in a routine.

precision, (1) the degree of exactness with which a quantity is stated. (2) The degree of discrimination or amount of detail; e.g., a 3 decimal digit quantity discriminates among 1000 possible quantities. A result may have more precision than it has accuracy; e.g., the true value of pi to 6 significant digits is 3.14159; the value 3.14162 is precise to 6 figures, given to 6 figures, but is accurate only to about 5.

precision, double, the retention of twice as many digits of a quantity as the computer normally handles; e.g., if a computer, whose basic word consists of 10 decimal digits is called upon to handle 20 decimal digit quantities, then double precision arithmetic must be resorted to.

precision, triple, the retention of three times as many digits of a quantity as the computer normally handles; e.g., a computer whose basic word consists of 10 decimal digits is called upon to handle 30 decimal digit quantities.

predicate, to affirm or deny, in mathematical logic, one or more subjects.

preliminary proposal review, see (review, preliminary proposal).

preselection, a technique for saving time available in buffered computers (by which a block of data is read into computer storage from the next input tape to be called upon before the data are required in the computer. The selection of the next input tape is determined by instructions to the computer.

preset, (1) to set the contents of a storage location to an initial value, (2) to establish the initial control value for a loop.

presumptive address, same as (address, base (1)).

preventive maintenance, see (maintenance, preventive).

primary storage, see (storage, primary).

primitive, a primitive usually pertains to the lowest level of a machine instruction or lowest unit of language translation.

printer electrostatic, same as (printer, xerographic).

printer, high-speed, a printer which operates at a speed more compatible with the speed of computation and data processing so that it may operate on-line. At the present time a printer operating at a speed of 250 lines per minute, 100 characters per line is considered high-speed. Synonymous with HSP.

printer, line, a device capable of printing one line of characters across a page; i.e., 100 or more characters simultaneously as continuous paper advances line by line in one direction past type bars or a type cylinder that contains all characters in all positions.

printer, matrix, same as (printer, wire).

printer, on the fly, a high-speed line printer using continuously rotating print wheels and fast-acting hammers to print the successive letters contained in one line of text so rapidly that all of the characters in the printed line look as though they were all printed simultaneously.

printer, serial, a device capable of printing characters, one at a time across a page. Many variations in serial printers exist; e.g., typewriter; stylus or matrix serial printer; and high-speed, multiple-line stylus or matrix serial printer.

printer, wire, a high-speed printer that prints character-like configurations of dots through the proper selection of wire-ends from a matrix of wire-ends, rather than conventional characters through the selection of type faces. Synonymous with (matrix printer).

printer, xerographic, a device for printing an optical image on paper in which dark and light areas of the original are represented by electro-statically charged and uncharged areas on the paper. The paper is dusted with particles of finely powdered dry ink and the particles adhere only to the electrically charged areas. The paper with ink particles is then heated, causing the ink to melt and become permanently fixed to the paper.

print-out, memory, same as (dump, storage).

probability theory, see (theory, probability).

problem, benchmark, a routine used to determine the speed performance of a computer. One method is to use one-tenth of the time required to perform nine complete additions and one complete multiplication. A complete addition or a complete multiplication time includes the time required to procure two operands from storage, perform the operation and store the result, and the time required to select and execute the required number of instructions to do this.

problem, check, a problem chosen to determine whether the computer or a program is operating correctly.

problem definition, see (definition, problem).

problem oriented language, see (language, problem oriented).

problem, trouble location, a test problem whose incorrect solution supplies information on the location of faulty equipment. It is used after a check problem has shown that a fault exists.

procedure, a precise step-by-step method for effecting a solution to a problem.

procedure oriented language, see (language, procedure oriented).

process, a general term covering such terms as assemble, compile, generate, interpret, and compute.

process chart, same as (chart, flow).

process control, see (control, process).

process, iterative, a process for calculating a desired result by means of a repeating cycle of operations, which comes closer and closer to the desired result; e.g., the arithmetical square root of N may be approximated by an iterative process using additions, subtractions, and divisions only.

processing, automatic data, data processing performed by a system of electronic or electrical machines so interconnected and interacting as to reduce to a minimum the need for human assistance or intervention. Synonymous with (ADP) and related to (system, automatic data processing).

processing, batch, a technique by which items to be processed must be coded and collected into groups prior to processing.

processing, centralized data, data processing performed at a single, central location on data obtained from several geographical locations or managerial levels. Decentralized data processing involves processing at various managerial levels or geographical points throughout the organization.

processing, data, (1) the preparation of source media which contain data or basic elements of information, and the handling of such data according to precise rules of procedure to accomplish such operations as classifying, sorting, calculating, summarizing, and recording. (2) The production of records and reports. Synonymous with (data handling).

processing, electronic data, data processing performed largely by electronic equipment. Synonymous with (EDP) and related to (processing, automatic data).

processing, information, a less restrictive term than data processing, encompassing the

totality of scientific and business operations performed by a computer.

processing, in-line, same as (on-line (2)).

processing, integrated data, (1) a system that treats as a whole, all data processing requirements to accomplish a sequence of data processing steps, or a number or related data processing sequences, and which strives to reduce or eliminate duplicating data entry or processing steps. (2) The processing of data by such a system. Synonymous with (IDP).

processing, on-line, same as (on-line (2)).

processing, parallel, the operation of a computer so that programs for more than one run are stored simultaneously in its storage, and executed concurrently.

processing, real time, the processing of information or data in a sufficiently rapid manner so that the results of the processing are available in time to influence the process being monitored or controlled. Synonymous with (real time system).

processor, (1) a generic term which includes assembly, compiling, and generation; (2) a shorter term for automatic data processor or arithmetic unit.

program, (1) the complete plan for the solution of a problem, more specifically the complete sequence of machine instructions and routines necessary to solve a problem. (2) To plan the procedures for solving a problem. This may involve among other things the analysis of the problem, preparation of a flow diagram, preparing details, testing, and developing subroutines, allocation of storage locations, specification of input and output formats, and the incorporation of a computer run into a complete data processing system. Related to (routine).

program address counter, same as (counter, location (2)).

program, assembly, same as (assembler).

program check, see (check, program).

program, coded, a program which has been expressed in the code or language of a specific machine or programing system.

program, control, a sequence of instructions which prescribe the series of steps to be taken by a system, a computer or any other device.

program control, see (control, program).

program counter, same as (register, control).

program, general, a program expressed in computer code designed to solve a class of problems, or specializing on a specific problem when appropriate parametric values are supplied. Synonymous with (general routine).

program generator, see (generator, program).

program, heuristic, same as (routine, heuristic).

program, internally stored, a sequence of instructions, stored inside the computer in the same storage facilities as the computer data, as opposed to external storage on punched paper tape and pinboards.

program language, see (language, program).

program, object, the program which is the output of an automatic coding system. Often the object program is a machine language program ready for execution, but it may well be in an intermediate language. Synonymous with (target program); (object routine) and contrasted with (program, source).

program parameter, see (parameter, program).

program patching plug, see (plug, program patching.

program register, see (register, program).

program sensitive malfunction, see (malfunction, program sensitive).

program, source, a computer program written in a language designed for ease of expression of a class of problems or procedures, by humans; e.g., symbolic or algebraic. A generator, assembler translator or compiler routine is used to perform the mechanics of translating the source program into an object program in machine language. Contrasted with (program, object).

program, specific, a program for solving a specific problem only.

program step, see (step, program).

program stop, see (stop, program).

program storage, see (storage, program).

program, stored, same as (routine, stored).

program, supervisory, same as (routine, executive).

program tape, see (tape, program).

program, target, same as (program, object).

program test, see (test, program).

program testing time, see (time, program testing).

program, utility, same as (routine, utility).

programed switch, same as (connector, variable (3)).

programer, a person who prepares problem solving procedures and flow charts and who may also write and debug routines.

programing, automatic, the method or technique whereby the computer itself is used to transform or translate programing from a language or form that is easy for a human being to produce, into a language that is efficient for the computer to carry out. Examples of automatic programing are compiling, assembling, and interpretive routines.

programing, interpretive, the writing of programs in a pseudo machine language, which is precisely converted by the computer into actual machine language instructions before being performed by the computer.

programing, linear, a technique of mathematics and operations research for solving certain kinds of problems involving many variables where a best value or set of best values is to be found. This technique is not to be confused with computer programing, although problems using the technique may be programed on a computer. Linear programing is most likely to be feasible when the quantity to be optimized, sometimes called the objective function, can be stated as a mathematical expression in terms of the various activities within the system, and when this expression is simply proportional to the measure of the activities; i.e., is linear, and when all the restrictions are also linear.

programing, micro, the technique of using a certain special set of instructions for an

automatic computer, that consists only of basic elemental operations which the programer may combine into higher level instructions, which he may then program using the higher level instructions only; e.g., if a computer has only basic instructions for adding, subtracting, and multiplying, the instruction for dividing would be defined by microprograming.

programing, minimum access, programing in in such a way that minimum waiting time is required to obtain information out of storage. Synonymous with (minimum latency programing) and contrasted with (programing, random access).

programing, minimum latency, same as (programing, minimum access).

programing, multiple, the programing of a computer by allowing two or more arithmetical or logical operations to be executed simultaneously. Contrasted with (programing, serial).

programing, optimum, programing in order to maximize efficiency with respect to some criterion; e.g., least storage usage, least time share of peripheral equipment, or least use of time between operations.

programing, random access, programing without regard to the time required for access to the storage positions called for in the program. Contrasted with (programing, minimum access).

programing, serial, the programing of a computer by which only one arithmetical or logical operation can be executed at one time; e.g., a sequential operation. Contrasted with (programing, multiple).

programing, symbolic, the use of arbitrary symbols to represent addresses in order to facilitate programing.

propagated error, see (error, propagated).

property sort, see (sort, property).

proportional band, see (band, proportional).

proportional control, see (control, proportional).

protection, file, a device or method which prevents accidential erasure of operative data on magnetic tape reels.

pseudo code, same as (code, symbolic).

pseudo instruction, see (instruction, pseudo).

pseudo-operation, an operation which is not part of the computer's operation repertoire as realized by hardware; hence an extension of the set of machine operations.

pseudo-random, the property of satisfying one or more of the standard criteria for statistical randomness but being produced by a definite calculation process. Related to (number, uniformly distributed random).

pseudo random number sequence, see (sequence, pseudo random number).

pulse, a significant, and sudden change of short duration in the level of some electric variable, usually voltage.

pulse code, see (code, pulse).

pulse, gate, a pulse which enables a gate circuit to pass a signal; usually, the gate pulse is of longer duration than the signal, to make sure that coincidence in time occurs.

pulse repetition rate, see (rate, pulse repetition).

pulse, sprocket, (1) a pulse generated by a magnetized spot which accompanies every character recorded on magnetic tape. This pulse is used during read operations to regulate the timing of the read circuits and also to provide a count on the number of characters read from tape. (2) A pulse generated by the sprocket or driving hole in paper tape which serves as the timing pulse for reading or punching the paper tape.

punch, (1) to shear a hole by forcing a solid or hollow, sharp edged tool through a material into a die; (2) the hole resulting from (1) above.

punch, automatic feed, a card punch having a hopper, a card track and a stacker. The movement of cards through the punch is automatic.

punch, electronic calculating, a card punch machine which reads a punch card, performs arithmetic and other operations sequentially and punches the result in a card.

punch card, see (card, punch).

punch, card, a machine which punches cards in designated locations to store data which can be conveyed to other machines or devices by reading or sensing the holes. Synonymous with (card punch unit).

punch card unit, same as (punch, card).

punch, eleven (11), same as (punch, X (2)).

punch, gang, to punch identical or constant information into all of a group of punch cards.

punch position, see (position, punch).

punch, spot, a hand operated device resembling a pair of pliers, for selectively punching holes in punch cards.

punch, summary, a card punch operating in conjunction with another machine, commonly a tabulator, to punch into cards data which have been summarized or calculated by the other machine.

punch tape, see (tape, punch).

punch tape code, see (code, punch tape).

punch, twelve (12), same as (punch, Y (2)).

punch, X, (1) a punch in the X or 11 row of an 80-column card. (2) A punch in position 11 of a column. The X punch is often used to control or select, or to indicate a negative number as if it were a minus sign. Also called an 11-punch. Synonymous with (eleven (11) punch).

punch, Y, (1) a punch in the Y or 12 row of an 80-column card; i.e., the top row of the card. (2) A punch in position 12 of a column. It is often used for additional control or selection, or to indicate a positive number as if it were a plus sign. Synonymous with (twelve (12) punch).

punch, zone, same as (overpunch).

punching, interstage, a system of punching in which only odd numbered rows of cards are used. Contrasted with (punching, normal stage).

punching, multiple, (1) the reference to punch cards and more specifically to Hollerith cards; (2) the punching of two or more holes in a column.

punching, normal stage, a system of punching in which only even numbered rows of the card are used. Contrasted with (punching, interstage).

punching positions, see (positions, punching).
punching rate, see (rate, punching).
purification, data, the reduction of the number of errors as much as possible prior to using data in an automatic data processing system.
push down list, see (list, push down).
push up list, see (list, push up).

Q

quadripuntal, pertaining to four punches, specifically having four random punches on a punch card. This term is used in determinative documentation.
quantity, a positive or negative real number in the mathematical sense.
quantity, double precision, a quantity having twice as many digits as are normally carried in a word of a fixed word-length computer.
quantize, same as (digitize).
quantizer, same as (digitizer).
quantum, the sub-ranges resulting from quantization.
quasi instruction, same as (instruction, pseudo).
quaternary signalling, see (signalling, quaternary).
queing theory, see (theory, queing).
question, encoded, a question set up and encoded in a form appropriate for operating, programing or conditioning a searching device.
quibinary code, see (code, quibinary).

R

radix, the quantity of characters for use in each of the digital positions of a numbering system. In the more common numbering systems the characters are some or all of the Arabic numerals as follows:

System Name	Characters	Radix
BINARY	(0, 1)	2
OCTAL	(0, 1, 2, 3, 4, 5,6,7)	8
DECIMAL	(0,1,2,3,4,5,6,7,8,9)	10

Unless otherwise indicated, the radix of any number is assumed to be 10. For positive identification of a radix 10 number, the radix is written in parentheses as a subscript to the expressed number; i.e., $126_{(10)}$. The radix of any nondecimal number is expressed in similar fashion; e.g., $11_{(2)}$ and $5_{(8)}$. Synonymous with (base); (base number) and (radix number).
radix complement, same as (complement (3)).
radix minus 1 complement, same as (complement (2)).
radix notation, see (notation, radix).
radix number, same as (radix).
radix point, see (point, radix).
RAM, Random Access Memory, see (storage, random access).
random access, see (access, random).
random access memory, same as (storage, random access).
random access programing, see (programming, random access).
random access storage, see (storage, random access).
random number generator, see (generator, random number).
random number sequence, see (sequence, random number).
range, (1) all the values which a function or word may have, (2) the difference between the highest and lowest of these values.
range, error, (1) the range of all possible values of the error of a particular quantity, (2) the difference between the highest and the lowest of these values.
rapid access loop, see (loop, rapid access).
rate action, see (action, rate).
rate, bit, the rate at which binary digits, or pulses representing them pass a given point on a communications line or channel. Clarified by (baud) and (capacity, channel).
rate, clock, the time rate at which pulses are emitted from the clock. The clock rate determines the rate at which logical or arithmetic gating is performed with a synchronous computer.
rate, error, the total amount of information in error, due to the transmission media, divided by the total amount of information received.
rate, perforation, the rate at which characters, rows or words are punched in a paper tape.
rate, pulse repetition, the number of electric pulses per unit of time experienced by a point in a computer, usually the maximum, normal or standard pulse rate.
rate, punching, the number of cards, characters, blocks, fields or words of information placed in the form of holes distributed on cards, or paper tape per unit of time.
rate, reading, the number of characters, words, fields, blocks or cards sensed by a sensing device per unit of time.
rate, reset, the number of corrections per unit of time made by the control system.
rate, sampling, the rate at which measurements of physical quantities are made; e.g., if it is desired to calculate the velocity of a missile and its position is measured each millisecond, then the sampling rate is 1,000 measurements per second.
rate, signalling, the rate at which signals are transmitted.
ratio, operating, the ratio of the number of hours of correct machine operation to the total hours of scheduled operation; e.g., on a 168-hour week scheduled operation, if 12 hours of preventive maintenance are required and 4.8 hours of unscheduled down time occurs, then the operating ratio is (168 - 16.8)/168, which is equivalent to a 90% operating ratio. Synonymous with (computer efficiency).
ratio, signal to noise, the ratio of the amount of signals conveying information to the amount of signals not conveying information.
raw data, see (data, raw).
read, (1) to sense information contained in some source, (2) the sensing of information contained in some source.
read around number, see (number, read around).
read-in, to sense information contained in some source and transmit this information to an internal storage.

read, non destructive, a reading of the information in a register without changing that information.

read-out, to sense information contained in some internal storage and transmit this information to a storage external to the computer.

read punch unit, see (unit, read punch).

read time, same as (time, access).

read while writing, the reading of a record or group of records into storage from tape at the same time another record or group of records is written from storage to tape.

read write check indicator, see (indicator, read write check).

read write head, see (head, read write).

read, card, (1) a mechanism that senses information punched into cards. (2) an input device consisting of a mechanical punch card reader and related electronic circuitry which transcribes data from punch cards to working storage or magnetic tape. Synonymous with (card reader unit).

reader, character, a specialized device which can convert data represented in one of the type fonts or scripts read by human beings directly into machine language. Such a reader may operate optically; or if the characters are printed in magnetic ink, the device may operate magnetically or optically.

reader, high-speed, a reading device capable of being connected to a computer so as to operate on-line without seriously holding up the computer. A card reader reading more than 250 cards per minute would be called a high-speed reader. A reader which reads punched paper tape at a rate greater than 50 characters per second could also be called a high-speed reader. Synonymous with (HSR).

reader, magnetic tape, a device capable of sensing information recorded on a magnetic tape in the form of a series of magnetized spots.

reader, paper tape, a device capable of sensing information punched on a paper tape in the form of a series of holes.

readiness review, see (review, readiness).

reading rate, see (rate, reading).

real time, same as (time, access).

real time clock, see (clock, real time).

real time operation, see (operation, real time).

real time processing, see (processing, real time).

real time system, same as (processing, real time).

recognition, character, the technology of using a machine to sense and encode into a machine language characters which are written or printed to be read by human beings.

recognition, pattern, the recognition of shapes or other patterns by a machine system. Patterns may be such as physical shapes or speech patterns.

record, (1) a group of related facts or fields of information treated as a unit, thus a listing of information, usually in printed or printable form; (2) to put data into a storage device.

record, fixed length, a record whose number of characters is fixed. The restriction may be deliberate to simplify and speed processing or may be caused by the characteristics of the equipment used.

record gap, see (gap, record).

record length, see (length, record).

record mark, see (mark, record).

record, reference, an output of a compiler that lists the operations and their positions in the final specific routine, and contains information describing the segmentation and storage allocation of the routine.

record storage mark, see (mark, record storage).

record, trailer, a record which follows a group of records and contains pertinent data related to the group of records.

record, unit (1) a separate record that is similar in form and content to other records; e.g., a summary of a particular employee's earnings to date. (2) Sometimes refers to a piece of non-tape auxiliary equipment; e.g., card reader, printer or console typewriter.

records, grouping of, the combining of two or more records into one block of information on tape, to decrease the wasted time due to tape acceleration and deceleration and to conserve tape space. This is also called blocking of records.

recursive, pertaining to a process which is inherently repetitive. The result of each repetition is usually dependent upon the result of the previous repetition.

red tape, same as (housekeeping).

red tape operation, same as (operation, bookkeeping).

redundant character, see (character, redundant).

redundant check, see (check, redundant).

reel, a spool of tape, generally magnetic tape.

reference address, same as (address, base (1)).

reference record, see (record, reference).

reference time, see (time, reference).

regeneration, (1) the process of returning a part of the output signal of an amplifier to its input circuit in such a manner that it reinforces the excitation and thereby increases the total amplification, (2) periodic restoration of stored information.

register, a hardware device used to store a certain amount of bits or characters. A register is usually constructed of elements such as transistors or tubes and usually contains approximately one word of information. Common programing usage demands that a register have the ability to operate upon information and not merely store information; hardware usage does not make the distinction.

register, B, see (B-register).

register, check, a register used to store information temporarily where it may be checked with the result of a succeeding transfer of this information.

register, circulating, (1) a shift register in which the stored information is moved right or left, and the information from one end is reinserted at the other end. In the case of a one-character right shift, the rightmost character reappears as the new leftmost character, and every other character is shifted one position to the right. (2) a register in which the process, as in 1, is continuously

occurring. This can be used as a delaying mechanism.

register, control, a register which holds the identification of the instruction word to be executed next in time sequence, following the current operation. The register is often a counter which in incremented to the address of the next sequential storage location, unless a transfer or other special instruction is specified by the program. Synonymous with (program counter) and contrasted with (register, program (1)).

register, index, a register which contains a quantity which may be used to modify addresses. Synonymous with (B-register (1)), and (B-box).

register, instruction, same as (register, program (2)).

register length, see (length, register).

register, magnetic shift, a register which makes use of magnetic cores as binary storage elements, and in which the pattern of binary digital information can be shifted from one position to the next left or right position.

register, memory, same as (register, storage).

register, operation, a register in which an operation is stored and analyzed in order to set conditions for the execution cycle.

register, program, a register in which the current instruction of the program is stored. Synonymous with (instruction register) and contrasted with (register, control).

register, shift, a register in which the characters may be shifted one or more positions to the right or left. In a right shift, the rightmost character(s) are lost. In a left shift, the leftmost character(s) are lost.

register, standby, a register in which accepted or verified information can be stored, so as to be available for a rerun in case the processing of the information is spoiled by a mistake in the program, or a malfunction in the computer.

register, storage, a register in the storage of the computer, in contrast with a register in one of the other units of the computer. Synonymous with (memory register).

registration, the accuracy of the positioning of punched holes in a card.

reimbursed time, see (time, reimbursed).

relationship, analytic, the relationship which exists between concepts, and corresponding terms, by virtue of their definition and inherent scope of meaning.

relationship, synthetic, a relation existing between concepts which pertains to empirical observation. Such relationships are involved, not in defining concepts or terms, but in reporting the results of observations and experiments.

relative address, see (address, relative).

relative code, see (code, relative).

reliability, (1) a measure of the ability to function without failure; (2) the amount of credence placed in a result.

reliability, channel, the percentage of time the channels meet the arbitrary standards established by the user.

reliability, circuit, the percentage of time the circuit meets arbitrary standards by the user.

relocate, to move a routine to another location.

remedial maintenance, see (maintenance, remedial).

reperforator, (1) the contraction of the words receiving perforator; (2) any tape punch which automatically converts coded electrical signals into performations in tape.

repertory instruction, (1) the set of instructions which a computing or data processing system is capable of performing, (2) the set of instructions which an automatic coding system assembles.

replacement, mechanical, an action originated by the contractor and taken by him to substitute one machine for another that is installed at a customer's site. Such action usually is occasioned by the mechanical condition of the equipment being replaced.

report generator, see (generator, report).

representation, analog, a representation which does not have discrete values but is continuously variable.

representation, positional, a number representation or number system in which the significance or value of each digit depends upon its place or position with respect to a radix point. Related to (system, number).

representative calculating time, see (time, representative calculating).

reproducer, card, a device that reproduces a punch card by punching another similar card.

requirements, information, the actual or anticipated questions which may be posed to an information system.

rerun, to repeat all or part of a program on a computer.

rerun-point, the stage of a computer run at which all information pertinent to the running of the routine is available either to the routine itself, or to a rerun routine in order that a run may be rerun.

rerun routine, see (routine, rerun).

reset, to return a device to zero or to an initial or arbitrarily selected condition.

reset cycle, see (cycle, reset).

reset rate, see (rate, reset).

residual error, see (error, residual).

residue check, see (check, residue).

resolver, a device which separates or breaks up a quantity, particularly a vector, into constituent parts or elements; e.g., the mutually perpendicular components of a plane vector.

response, frequency, a measure of the ability of a device to take into account, follow or act upon a varying condition; e.g., as applied to amplifiers, the frequencies at which the gain has fallen to the one-half power point or to 0.707 of the voltage gain, either at the high or low end of the frequency spectrum. When applied to a mechanical controller, the maximum rate at which changes in condition can be followed and acted upon, since it is implied that the controller can follow slow changes.

restart, to go back to a specific planned point in a routine, usually in the case of machine malfunction, for the purpose of rerunning the portion of the routine in which the error occured. The length of time between restart

points in a given routine should be a function of the mean free error time of the machine itself.

restore, to return an index register, a variable address, or other computer word to its initial or preselected value.

retrieval, information, the recovering of desired information or data from a collection of documents or other graphic records.

retrievals, false, the library references which are not pertinent to but are vaguely related to the subject of the library search and are sometimes obtained by automatic search methods.

return, the mechanism providing for a return in the usual sense. In particular a set of instructions at the end of a subroutine which permit control to return to the proper point in the main routine.

reverse code dictionary, see (dictionary, reverse code).

review, preliminary proposal, an on-site review to provide guidance to proponent agencies in the preparation of ADP system proposals.

review, readiness, an on-site examination of the adequacy of preparations for effective utilization upon installation of a computer, and to identify any necessary corrective actions.

revolver, same as (loop, rapid access).

rewind, to return a film or magnetic tape to its beginning or passed location.

rewrite, the process in a storage device of restoring the information in the device to its state prior to reading.

ring counter, see (counter, ring).

ring shift, same as (shift, cyclic).

rise time, see (time, rise).

role indicator, see (indicator, role).

rollback routine, same as (routine, rerun).

roll-out, a process, often used in diagnostic routines, in which a register or counter is read out by the following process: Add 1 to the digits in each column simultaneously; do thin n times, where n is the radix of the number in the register; when the result in each column changes from n-1 to 0, issue a signal.

round, deletion of the least significant digit(s) with or without modifications to reduce bias. Synonymous with (round off).

rounding error, see (error, rounding).

round-off, same as (round).

round-off error, same as (error, rounding).

routine, a set of coded instructions arranged in proper sequence to direct the computer to perform a desired operation or sequence of operations. A subdivision of a program consisting of two or more instructions that are functionally related; therefore, a program. Clarified by (subroutine) and related to (program).

routine, assembly, same as (assembler).

routine, automatic, a routine that is executed independently of manual operations, but only if certain conditions occur within a program or record, or during some other process.

routine, auxiliary, a routine designed to assist in the operation of the computer and in debugging other routines.

routine check, same as (check, program (2)).

routine, closed, a routine which is not inserted as a block of instructions within a main routine but is entered by basic linkage from the main routine.

routine, compiling, same as (compiler).

routine, debugging aid, a routine to aid programers in the debugging of their routines. Some typical routines are: storage, print-out, tape print-out and drum print-out routines.

routine, diagnostic, a routine used to locate a malfunction in a computer, or to aid in locating mistakes in a computer program. Thus, in general any routine specifically designed to aid in debugging or trouble shooting. Synonymous with (malfunction routine) and related to (debugging (2)).

routine, error detection, a routine used to detect whether or not an error has occurred, usually without special provision to find or indicate its location.

routine, executive, a routine which controls loading and relocation of routines and in some cases makes use of instructions which are unknown to the general programer. Effectively, an executive routine is part of the machine itself. Synonymous with (monitor routine); (supervisory routine) and (supervisory program).

routine, floating point, a set of subroutines which cause a computer to execute floating point arithmetic. These routines may be used to simulate floating point operations on a computer with no built in floating point hardware.

routine, general, same as (program, general).

routine, generating, a form of compiling routine, capable of handling less fully defined situations.

routine, heuristic, a routine by which the computer attacks a problem not by a direct algorithmic procedure, but by a trial and error approach frequently involving the act of learning. Synonymous with (heuristic program).

routine, housekeeping, the initial instructions in a program which are executed only one time; e.g., clear storage.

routine, input, a routine, sometimes stored permanently in a computer, to allow reading of programs and data into the machine.

routine, interpretive, a routine which decodes and immediately executes instructions written as pseudo codes. This is contrasted with a compiler which decodes the pseudo codes into a machine language routine to be executed at a later time. The essential characteristic of an interpretive routine is that a particular pseudo code operation must be decoded each time it is executed. Synonymous with (interpretive code).

routine library, see (library, routine).

routine, loading, a routine which, once it is itself in storage, is able to bring other information into storage from cards or tape.

routine, malfunction, same as (routine, diagnostic).

routine, minimum access, a routine so coded that by judicious arrangement of data and instructions in storage, the actual access time is less than the expected random access

time. Such a routine is used with serial storage systems. Synonymous with (minimum latency routine).

routine, minimum latency, same as (routine, minimum access).

routine, monitor, same as (routine, executive).

routine, object, same as (program, object).

routine, open, a routine which can be inserted directly into a larger routine without a linkage or calling sequence.

routine, post mortem, a service routine useful in analyzing the cause of a failure, such as a routine that dumps out the content of a store after a failure. Related to (post mortem).

routine, rerun, a routine designed to be used after a computer malfunction or a coding or operating mistake to reconstitute a routine from the last previous rerun point. Synonymous with (rollback routine).

routine, rollback, same as (routine, rerun).

routine, sequence checking, a routine which checks every instruction executed, and prints out certain data; e.g., to print out the coded instructions with addresses, and the contents of each of several registers, or it may be designed to print out only selected data, such as transfer instructions and the quantity actually transferred.

routine, service, a broad class of routines which are standardized at a particular installation for the purpose of assisting in maintenance and operation of the computer as well as the preparation of programs as opposed to routines for the actual solution of production problems. This class includes monitoring or supervisory routines, assemblers, compilers, diagnostics for computer malfunctions, simulation of peripheral equipment, general diagnostics and input data. The distinguishing quality of service routines is that they are generally standardized so as to meet the servicing needs at a particular installation, independent of any specific production type routine requiring such services.

routine, specific, a routine to solve a particular mathematical, logical, or data handling problem in which each address refers to explicitly stated registers and locations.

routine, stored, a series of instructions in storage to direct the step-by-step operation of the machine. Synonymous with (stored program).

routine, supervisory, same as (routine, executive).

routine, test, a routine designed to show whether a computer is functioning properly or not.

routine, tracing, a diagnostic routine used to provide a time history of one or more machine registers and controls during the execution of the object routine. A complete tracing routine would reveal the status of all registers and locations affected by each instruction, each time the instruction is executed. Since such a trace is prohibitive in machine time, traces which provide information only following the execution of certain types of instructions are more frequently used. Furthermore, a tracing routine may be under control of the processor, or may be called in by means of a trapping feature. Related to (trap (1)).

routine, translating, same as (translator (1)).

routine, utility, a standard routine used to assist in the operation of the computer; e.g., a conversion routine, a sorting routine, a printout routine, or a tracing routine. Synonymous with (utility program).

routing, message, the function performed at a central message processor of selecting the route, or alternate route if required, by which a message will proceed to the next point in reaching its destination.

row binary, a method of representing binary numbers on a card where successive bits are represented by the presence or absence of punches in a successive position in a row as opposed to a series of columns. Row binary is especially convenient in 40 bit word, or less, computers; wherein the card frequently is used to store 12 binary words on each half of the card.

row pitch, the distance measured along paper tape between the centers of adjacent holes.

ruly english, see (english, ruly).

run, the performance of one program on a computer, thus the performance of one routine, or several routines linked so that they form an automatic operating unit, during which manual manipulations by the computer operator are zero, or at least minimal.

run, machine, the execution of one or several machine routines which are linked to form one operating unit.

running, parallel, (1) the running of a newly developed system in a data processing area in conjunction with the continued operation of the current system; (2) the final step in the debugging of a system, this step follows a system test.

S

sampling rate, see (rate, sampling).

scale, a range of values frequently dictated by the computer word-length or routine at hand.

scale factor, see (factor, scale).

scan, to examine every reference or every entry in a file routinely as a part of a retrieval scheme; occasionally, to collate.

scanner, an instrument which automatically samples or interrogates the state of various processes, files, conditions, or physical states and initiates action in accordance with the information obtained.

scheduled operation, see (operation, scheduled).

screen, (1) the surface in an electrostatic cathode ray storage tube where electrostatic charges are stored, and by means of which information is displayed or stored temporarily; (2) to make a preliminary selection from a set of entities, selection criteria being based on a given set of rules or conditions.

SDA, Source Data Automation, see (automation, source data).

search, to examine a series of items for any that have a desired property or properties.

search, binary, a search in which the series of items is divided into two parts, one of which is rejected, and the process repeated

on the unrejected part until the item with the desired property is found. This process usually depends upon the presence of a known sequence in the series. Synonymous with (dichotomizing search).

search, conjunctive, a search defined in terms of a logical product; i.e., conjunctive form, in contrast to a disjunctive form, or logical sum.

search, dichotomizing, same as (search, binary).

search, disjunctive, a search defined in terms of a logical sum; i.e., disjunctive form, in contrast to a conjunctive form or logical product.

search time, see (time, search).

second level address, same as (address, indirect).

secondary storage, see (storage, secondary).

section, arithmetic, same as (unit, arithmetic).

seek, to look for data according to information given regarding that data; occasionally used interchangeably and erroneously for (search), (scan) and (screen).

segment, (1) to divide a routine in parts, each consisting of an integral number of subroutines, and each part capable of being completely stored in the internal storage and containing the necessary instructions to jump to other segments. (2) That portion of a routine too long to fit into internal storage which is short enough to be stored entirely in the internal storage; such a segment contains the coding necessary to call in other segments automatically. Routines which exceed internal storage capacity may be automatically divided into segments by a compiler.

segment mark, see (mark, segment).

select, (1) to take the alternative A if the report on a condition is of one state, and alternative B if the report on the condition is of another state; (2) to choose a needed subroutine from a file of subroutines.

selection check, see (check, selection).

selective trace, see (trace, selective).

selector, a device which interrogates a condition and initiates one of several alternate operations.

self checking code, same as (code, error detecting).

self checking number, see (number, self checking).

self demarking code, see (code, self demarking).

self organizing, having the capability of classification or internal rearrangement, depending on the environment in accordance with given instructions or a set of rules.

self organizing machine, see (machine, self organizing).

semantic matrix, see (matrix, semantic).

semiconductor, a solid with an electrical conductivity that lies between the high conductivity of metals and the low conductivity of insulators. Semiconductor circuit elements include crystal diodes and transistors.

sense, (1) to examine, particularly relative to a criterion; (2) to determine the present arrangement of some element of hardware, especially a manually-set switch; (3) to read punched holes or other marks.

sensing, mark, a technique for detecting special pencil marks entered in special places on a punch card and automatically translating the marks into punched hole.

sensitivity, the degree of response of an instrument or control unit to a change in the incoming signal.

sentinel, same as (flag (3)).

septenary number, see (number, septenary).

sequence, (1) to put a set of symbols into an arbitrarily defined order; i.e., to select A if A is greater than or equal to B, or select B if A is less than B. (2) an arbitrarily defined order of a set of symbols; i.e., an orderly progression of items of information or of operations in accordance with some rule.

sequence, calling, the instructions used for linking a closed subroutine with a main routine; i.e., standard linkage and a list of the parameters.

sequence check, see (check, sequence).

sequence checking routine, see (routine, sequence checking).

sequence, collation, the sequence in which the characters acceptable to a computer are ordered.

sequence, control, the normal order of selection of instructions for execution. In some computers one of the addresses in each instruction specifies the control sequence. In most other computers, the sequence is consecutive except where a transfer occurs.

sequence, pseudo random number, an order of numbers produced by a definite recursive rule but satisfying one or more of the standard tests for randomness. Such numbers may be uniform (any number in the set of possible numbers being equally likely), normal or Gaussian (having the property of normal or Gaussian distribution), or satisfy some other type of statistical distribution.

sequence, random number, an unpredictable array of numbers produced by change, and satisfying one or more of the tests for randomness.

sequencer, same as (sorter).

sequential access storage, see (storage, sequential access).

sequential control, see (control, sequential).

sequential operation, see (operation, sequential).

serial, (1) the handling of one after the other in a single facility, such as transfer or store in a digit-by-digit time sequence, or to process a sequence of instructions one at a time; i.e., sequentially. (2) The time sequence transmission of, storage of, or logical operations on the parts of a word, with the same facilities for successive parts. Related to (operation, serial) and contrasted with (parallel (2)).

serial access, see (access, serial).

serial computer, see (computer, serial).

serial operation, see (operation, serial).

serial-parallel, (1) a combination of serial and parallel; e.g., serial by character, parallel by bits comprising the character. (2) Descriptive of a device which converts a serial input into a parallel output.

serial programming, see (programming, serial).
serial storage, see (storage, serial).
serial transfer, see (transfer, serial).
serial transmission, see (transmission, serial).
series, time, the discrete or continuous sequence of quantitative data assigned to specific moments in time, usually studied with respect to their distribution in time.
service, half duplex, a type of communication channel which is capable of transmitting and receiving signals, but is not capable for simultaneous and independent transmission and reception.
service routine, see (routine, service).
servicing time, same as (time, engineering).
servomechanism, a device to monitor an operation as it proceeds, and make necessary adjustments to keep the operation under control. A furnace thermostat is an example of a servomechanism. Clarified by (hunting).
set, (1) to place a storage device in a prescribed state. (2) To place a binary cell in the one state. (3) A collection of elements having some feature in common or which bear a certain relation to one another; e.g., all even numbers, geometrical figures, terms in a series, a group of irrational numbers, all positive even integers less than 100 may be a set or a sub-set.
set, character, an agreed set of representations, called characters from which selections are made to denote and distinguish data. Each character differs from all others, and the total number of characters in a given set is fixed; e.g., a set may include the numerals 0 to 9, the letters A to Z, punctuation marks and a blank or space. Clarified by alphabet.
set-up time, see (time, set-up).
sexadecimal number, see (number, sexadecimal).
shift, to move the characters of a unit of information columnwise right or left. For a number, this is equivalent to multiplying or dividing by a power of the base of notation. Related to (shift, arithmetic) and (shift, cyclic).
shift, arithmetic, to multiply or divide a quantity by a power of the number base; e.g., if binary 1101, which represents decimal 13, is arithmetically shifted twice to the left, the result is 110100, which represents 52, which is also obtained by multiplying 13 by 2 twice; on the other hand, if the decimal 13 were to be shifted to the left twice, the result would be the same as multiplying by 10 twice, or 1300. Related to (shift) and (shift, cyclic).
shift, circular, same as (shift, cyclic).
shift, cyclic, a shift in which the digits dropped-off at one end of a word are returned at the other in a circular fashion; e.g., if, register holds eight digits, 23456789, the result of a cyclic shift two columns to the left would be to change the contents of the register to 45678923. Synonymous with (circular shift); (end-around shift); (logical shift); (non arithmetic shift); and (ring shift).
shift, end around, same as (shift, cyclic).
shift, logical, same as (shift, cyclic).
shift, non arithmetic, same as (shift, cyclic).
shift, phase, the time difference between the input and output signal or between any two synchronized signals, of a control unit, system, or circuit.
shift register, see (register, shift).
shift, ring, same as (shift, cyclic).
shop, closed, the operation of a computer facility where programming service to the user is the responsibility of a group of specialists, thereby effectively separating the phase of task formulation from that of computer implementation. The programers are not allowed in the computer room to run or oversee the running of their programs. Contrasted with (shop, open).
shop, open, the operation of a computer facility where computer programming, coding and operating can be performed by any qualified employee of the organization, not necessarily by the personnel of the computing center itself and where the programer may assist in, or oversee the running of his program on the computer. Contrasted with (shop, closed).
short word, see (word, short).
sign, (1) in arithmetic, a symbol which distinguishes negative quantities from positive ones. (2) An indication of whether a quantity is greater than zero, or less than zero. The signs often are the marks = and -, respectively; but other arbitrarily selected symbols may be used; such as a 0 and 1, or 0 and 9, when used as codes at a predetermined location, can be interpreted by a person or machine.
sign bit, see (bit, sign).
sign check indicator, see (indicator, sign check).
sign digit, see (digit, sign).
signal, the event, phenomenon or electrical quantity which conveys information from one point to another.
signal attenuation, see (attenuation, signal).
signal, carry-complete, a signal generated by a digital parallel adder, indicating that all carries from an adding operation have been generated and propagated and the addition operation is completed.
signal conditioning, see (conditioning, signal).
signal, feedback control, that portion of the output signal which is returned to the input in order to achieve a desired effect, such as fast response.
signal, inhibiting, a signal, which when entered into a specific circuit will prevent the circuit from exercising its normal function; e.g., an inhibit signal fed into an AND gate will prevent the gate from yielding an output when all normal input signals are present.
signal to noise ratio, see (ratio, signal to noise).
signalling, binary, a communications mode in which information is passed by the presence and absence, or plus and minus variations of one parameter of the signalling medium only.
signalling, octonary, a communications mode in which information is passed by the presence and absence or plus and minus variation of eight discrete levels of one parameter of the signalling medium.

signalling, quaternary, an electrical communications mode in which information is passed by the presence and absence, or plus and minus variations of four discrete levels of one parameter of the signalling medium.

signalling rate, see (rate, signalling).

signed field, see (field, signed).

significant digits, see (digits, significant).

simulation, (1) the representation of physical systems and phenomena by computers, models or other equipment; e.g., an imitative type of data processing in which an automatic computer is used as a model of some entity; e.g., a chemical process. Information enters the computer to represent the factors entering the real process, the computer produces information that represents the results of the process, and the processing done by the computer represents the process itself. (2) In computer programming, the technique of setting up a routine for one computer to make it operate as nearly as possible like some other computer.

simulator, (1) a computer or model which represents a system or phenomenon and which mirrors or maps the effects of various changes in the original, enabling the original to be studied, analyzed, and understood by means of the behaviour of the model; (2) a program or routine corresponding to a mathematical model or representing a physical model; (3) a routine which is executed by one computer but which imitates the operations of another computer.

simultaneous access, same as (access, parallel).

single address, same as (address, one (2)).

single-step operation, see (operation, single-step).

size, item, (1) the magnitude of an item, usually expressed in numbers of words, characters or blocks; (2) the number of characters in an item.

skeletal code, see (code, skeletal).

skip, same as (instruction, skip), and (instruction, no-op (3)).

skip instruction, see (instruction, skip).

skip, tape, a machine instruction to space forward and erase a portion of tape when a defect on the tape surface causes a write error to persist.

snapshot dump, see (dump, snapshot).

software, the totality of programs and routines used to extend the capabilities of computers, such as compilers, assemblers, narrators, routines, and subroutines. Contrasted with (hardware).

solid state, the electronic components that convey or control electrons within solid materials; e.g., transistors, germanium diodes, and magnetic cores. Thus, vacuum and gas tubes are not included.

solid state computer, see (computer, solid state).

solver, equation, a calculating device, usually analog, which solves systems of linear simultaneous non-differential equations or determines the roots of polynomials or both.

sonic delay line, same as (line, acoustic delay).

sophisticated vocabulary, see (vocabulary, sophisticated).

sort, to arrange items of information according to rules dependent upon a key or field contained in the items or records; e.g., to digital sort is to sort first the keys on the least significant digit, and to resort on each higher order digit until the items are sorted on the most significant digit.

sort, block, a sort of one or more of the most significant characters of a key to serve as a means of making workable sized groups from a large volume of records to be sorted.

sort, four-tape, to four-tape sort is to merge sort in which input data are supplied on two tapes, and are sorted into incomplete sequences alternately on two output tapes, the output tapes are used for input on the succeeding pass, resulting in longer and longer sequences after each pass until the data are all in one sequence on one output tape.

sort, merge, to produce a single sequence of items, ordered according to some rule, from two or more previously unordered sequences, without changing the items in size, structure, or total number, although more than one pass may be required for a complete sort, items are selected during each pass on the basis of the entire key.

sort, property, the selection of items from a group which satisfy a certain criterion.

sorter, a machine which puts items of information into a particular order; e.g., it will determine whether A is greater than, equal to or less than B and sort or order accordingly. Synonymous with (sequencer).

source data automation, see (automation, source data).

source document, see (document, source).

source language, see (language, source).

source program, see (program, source).

space, same as (blank (1)).

space, dead, same as (band, dead).

space, working, same as (storage, working).

special purpose computer, see (computer, special purpose).

specific address, same as (address, absolute).

specific code, same as (code, absolute).

specific program, see (program, specific).

specific routine, see (routine, specific).

speed, transmission, the number of information elements sent per unit time, usually expressed as bits, characters, word groups, or records per second or per minute.

spot, flying, a small, rapidly moving, spot of light, usually generated by a cathode-ray tube and used to illuminate successive spots of a surface containing dark and light areas. The varying amount of light reflected is detected by a phototube and used to produce a time succession of electronic signals which effectively describe the surface.

spot punch, see (punch, spot).

sprocket pulse, see (pulse, sprocket).

stacker, card, (1) a receptacle that accumulates cards after they have passed through a machine. (2) A hopper. Synonymous with (hopper).

stacker, input, same as (magazine, input).

stacker, output, same as (magazine, output).

standard subroutine, see (subroutine, standard).

standing-on-nines carry, see (carry, standing on nines).
standardize, same as (normalize).
standby application, see (application, standby).
standby block, see (block, standby).
standby register, see (register, standby).
standby time, see (time, standby).
standby unattended time, see (time, standby unattended).
start time, same as (time, acceleration).
static storage, see (storage, static).
static subroutine, see (subroutine, static).
staticizer, (1) a storage device for converting time sequential information into static parallel information, (2) a type of buffer.
station, inquiry, the remote terminal device from which an inquiry into computing or data processing equipment is made.
step change, see (change, step).
step, program, a phase of one instruction or command in a sequence of instructions. Thus, a single operation.
stop, automatic, an automatic halting of a computer processing operation as the result of an error detected by built-in checking devices.
stop, coded, a stop instruction built into the routine.
stop, form, the automatic device on a printer which stops the machine when paper has run out.
stop, program, a stop instruction built into the program that will automatically stop the machine under certain conditions, or upon reaching the end of the processing, or completing the solution of a problem.
stop time, same as (time, deceleration).
storage, (1) the term preferred to memory. (2) Pertaining to a device in which data can be stored and from which it can be obtained at a later time. The means of storing data may be chemical, electrical or mechanical. (3) A device consisting of electronic, electrostatic, electrical, hardware or other elements into which data may be entered, and from which data may be obtained as desired. (4) The erasable storage in any given computer. Synonymous with (memory).
storage allocation, see (allocation, storage).
storage, auxiliary, a storage device in addition to the main storage of a computer; e.g., magnetic tape, disk or magnetic drum. Auxiliary storage usually holds much larger amounts of information than the main storage, and the information is accessible less rapidly. Contrasted with (storage, main).
storage, buffer, (1) a synchronizing element between two different forms of storage, usually between internal and external. (2) An input device in which information is assembled from external or secondary storage and stored ready for transfer to internal storage. (3) An output device into which information is copied from internal storage and held for transfer to secondary or external storage. Computation continues while transfers between buffer storage and secondary or internal storage or vice versa take place. (4) Any device which stores information temporarily during data transfers. Clarified by (buffer).
storage capacity, see (capacity, storage).
storage, circulating, a device or unit which stores information in a train or pattern of pulses, where the pattern of pulses issuing at the final end are sensed, amplified, reshaped and re-inserted into the device at the beginning end.
storage, core, same as (storage, magnetic core).
storage cycle, see (cycle, storage).
storage, di-cap, a device capable of holding data in the form of an array of charged capacitors, or condensers, and using diodes for controlling information flow.
storage, disk, the storage of data on the surface of magnetic disks. Related to (disk, magnetic) and (storage, magnetic disk).
storage dump, see (dump, storage).
storage, dynamic, the storage of data on a device or in a manner that permits the data to move or vary with time, and thus the data is not always available instantly for recovery; e.g., acoustic delay line, magnetic drum, or circulating or re-circulating of information in a medium. Synonymous with (dynamic memory).
storage, electrostatic, (1) the storage of data on a dielectric surface such as the screen of a cathode ray tube, in the form of the presence or absence of spots bearing electrostatic charges, that can persist for a short time after the electrostatic charging force is removed. (2) A storage device so used.
storage, erasable, (1) a storage device whose data can be altered during the course of a computation; e.g., magnetic tape, drum and cores. (2) An area of storage used for temporary storage.
storage, external, (1) the storage of data on a device which is not an integral part of a computer, but in a form prescribed for use by the computer. (2) A facility or device, not an integral part of a computer, on which data usable by a computer is stored such as, off-line magnetic tape units, or punch card devices. Synonymous with (external memory) and contrasted with (storage, internal).
storage, fast access, the section of the entire storage from which data may be obtained most rapidly.
storage, internal, (1) the storage of data on a device which is an integral part of a computer. (2) The storage facilities forming an integral physical part of the computer and directly controlled by the computer. In such facilities all data are automatically accessible to the computer; e.g., magnetic core, and magnetic tape on-line. Synonymous with (internal memory) and contrasted with (storage, external).
storage, magnetic, a device or devices which utilize the magnetic properties of materials to store information.
storage, magnetic core, a storage device in which binary data is represented by the direction of magnetization in each unit of an array of magnetic material, usually in the shape of toroidal rings, but also in other

forms such as wraps on bobbins. Synonymous with (core storage).

storage, magnetic disk, a storage device or system consisting of magnetically coated disks, on the surface of which information is stored in the form of magnetic spots arranged in a manner to represent binary data. These data are arranged in circular tracks around the disks and are accessible to reading and writing heads on an arm which can be moved mechanically to the desired disk and then to the desired track on that disk. Data from a given track are read or written sequentially as the disk rotates. Related to (storage, disk).

storage, magnetic drum, the storage of data on the surface of magnetic drums. Related to (drum, magnetic).

storage, magnetic tape, a storage device in which data is stored in the form of magnetic spots on metal or coated plastic tape. Binary data are stored as small magnetized spots arranged in column form across the width of the tape. A read-write head is usually associated with each row of magnetized spots so that one column can be read or written at a time as the tape traverses the head.

storage, main, usually the fastest storage device of a computer and the one from which instructions are executed. Contrasted with (storage, auxiliary).

storage, mark, see (mark, storage).

storage, mercury, the storage of data in a mercury delay line. Related to (line, mercury delay).

storage, non erasable, a storage device whose information cannot be erased during the course of computation; e.g., punched-paper tape, and punched cards, magnetic slug, "missing core," and silvered or aluminized paper.

storage, non volatile, a storage medium which retains information in the absence of power and which may be made available upon restoration of power; e.g., magnetic tapes, cores, drums, and discs. Contrasted with (storage, volatile).

storage, parallel, the storage of data in which all bits, characters, or especially words are essentially equally available in space, without time being one of the factors. When words are in parallel, the storage is said to be parallel by words; when characters within words, or binary digits within words or characters, are dealt with simultaneously, not one after the other, the storage is parallel by characters, or parallel by bit respectively. Contrasted with (storage, serial).

storage, permanent, a method or device used to retain intermediate or final results outside of the machine, usually in the form of punched cards or magnetic tape.

storage, primary, the main internal storage.

storage, program, a portion of the internal storage reserved for the storage of programs, routines, and subroutines. In many systems protection devices are used to prevent inadvertent alteration of the contents of the program storage. Contrasted with (storage, working).

storage, random access, a storage technique in which the time required to obtain information is independent of the location of the information most recently obtained. This strict definition must be qualified by the observation that we usually mean relatively random. Thus, magnetic drums are relatively non-random access when compared to magnetic cores for main storage, but are relatively random access when compared to magnetic tapes for file storage. Synonymous with (random access memory) and contrasted with (storage, sequential access).

storage resister, see (register, storage).

storage, secondary, the storage facilities not an integral part of the computer but directly connected to and controlled by the computer; e.g., magnetic drum and magnetic tapes.

storage, sequential access, a storage technique in which the items of information stored become available only in a one after the other sequence, whether or not all the information or only some of it is desired; e.g., magnetic tape storage. Related to (storage, serial), and contrasted with (storage, random access).

storage, serial, a storage technique in which time is one of the factors used to locate any given bit, character, word, or groups of words appearing one after the other in time sequence, and in which access time includes a variable latency or waiting time of from zero to many word times. A storage is said to be serial by word when the individual bits comprising a word appear serially in time; or a storage is serial by character when the characters representing coded decimal or other non binary numbers appear serially in time; e.g., magnetic drums are usually serial by word but may be serial by bit, or parallel by bit, or serial by character and parallel by bit. Related to (storage, sequential access) and contrasted with (storage, random access and storage), (parallel).

storage, static, the storage of data on a device or in a manner such that information is fixed in space and available at any time; e.g., flip-flop, electrostatic, or magnetic-core storage.

storage, temporary, same as (storage, working).

storage, volatile, a storage medium in which information cannot be retained without continuous power dissipation. Contrasted with (storage, non volatile).

storage, williams tube, same as (tube, williams).

storage, working, a portion of the internal storage reserved for the data upon which operations are being performed. Synonymous with (working space and temporary storage) and contrasted with (storage, program).

storage, zero access, the storage for which the latency (waiting time) is small. Though once widely used, this term is becoming less acceptable, since it constitutes a misnomer.

store, (1) to transfer an element of information to a device from which the unaltered information can be obtained at a later time, (2) to retain data in a device from which it can be obtained at a later time.

stored program, same as (routine, stored).
stored program computer, see (computer, stored program).
stored routine, see (routine, stored).
straight line code, see (code, straight line).
string, a set of records which is in ascending, or descending sequence according to a key contained in the records.
study, application, the detailed process of determining a system or set of procedures for using a computer for definite functions or operations, and establishing specifications to be used as a base for the selection of equipment suitable to the specific needs.
subprogram, a part of a larger program which can be converted into machine language independently.
subroutine, (1) the set of instructions necessary to direct the computer to carry out a well defined mathematical or logical operation. (2) A subunit of a routine. A subroutine is often written in relative or symbolic coding even when the routine to which it belongs is not. (3) A portion of a routine that causes a computer to carry out a well-defined mathematical or logical operation. (4) A routine which is arranged so that control may be transferred to it from a master routine and so that, at the conclusion of the subroutine, control reverts to the master routine. Such a subroutine is usually called a closed subroutine. (5) A single routine may simultaneously be both a subroutine with respect to another routine and a master routine with respect to a third. Usually control is transferred to a single subroutine from more than one place in the master routine and the reason for using the subroutine is to avoid having to repeat the same sequence of instructions in different places in the master routine. Clarified by (routine).
subroutine, closed, a subroutine not stored in the main path of the routine. Such a subroutine is entered by a jump operation and provision is made to return control to the main routine at the end of the operation. The instructions related to the entry and re-entry function constitute a linkage. Synonymous with (linked subroutine).
subroutine, direct insert, same as (subroutine, open).
subroutine, dynamic, a subroutine which involves parameters, such as decimal point position or item size, from which a relatively coded subroutine is derived. The computer itself is expected to adjust or generate the subroutine according to the parametric values chosen.
subroutine, in-line, a subroutine inserted directly into the linear operational sequence. Such a subroutine must be recopied at each point that it is needed in a routine.
subroutine library, see (library, subroutine).
subroutine, linked, same as (subroutine, closed).
subroutine, open, a subroutine inserted directly into the linear operational sequence, not entered by a jump. Such a subroutine must be recopied at each point that it is needed in a routine. Synonymous with (subroutine, direct insert).
subroutine, standard, a subroutine which is applicable to a class of problems.
subroutine, static, a subroutine which involves no parameters other than the addresses of the operands.
subset, (1) a set contained within a set, (2) a subscriber apparatus in a communications network.
subtrahend, the number or quantity which is subtracted from another number, called the minuend, giving a result usually called the difference, or sometimes called the remainder.
sum, logical, a result, similar to an arithmetic sum, obtained in the process of ordinary addition, except that the rules are such that a result of one is obtained when either one or both input variables is a one, and an output of zero is obtained when the input variables are both zero. The logical sum is the name given the result produced by the (inclusive or operator).
summary punch, see (punch, summary).
summation check, see (check, summation).
supervisor, a special executive routine.
supervisory control, see (control, supervisory).
supervisory routine, same as (routine, executive).
supervisory program, same as (routine, supervisory).
suppression, zero, the elimination of nonsignificant zeros to the left of significant digits usually before printing.
switch, (1) a point in a programing routine at which two courses of action are possible, the correct one being determined by a condition prevailing elsewhere in the routine or by a physical disposition of the system; (2) an on-off device to inhibit signal flow.
switch, breakpoint, a manually operated switch which controls conditional operation at breakpoints, used primarily in debugging.
switch, electronic, a circuit element causing a start and stop action or a switching action electronically, usually at high speeds.
switch, function, a circuit having a fixed number of inputs and outputs designed such that the output information is a function of the input information, each expresses in a certain code, signal configuration, or pattern.
switch, n-way, same as (connector, variable (3)).
switch, programed, same as (connector, variable (3)).
switch, toggle, (1) a manually operated electric switch, with a small projecting knob or arm that may be placed in either of two positions, "on" or "off," and will remain in that position until changed; (2) an electronically operated circuit that holds either of two states until changed.
switching blank, same as (band, dead).
switching time, see (time, switching).
symbol, a substitute or representation of characteristics, relationships, or transformations of ideas or things.
symbol, breakpoint, a symbol which may be optionally included in an instruction, as an

indication, tag, or flag, to designate it as a breakpoint.

symbol, logical, a sign used as an operator to denote the particular operation to be performed on the associated variables.

symbol, terminating, a symbol on the tape indicating the end of a block of information. Related to (gap (2)).

symbolic address, see (address, symbolic).

symbolic code, see (code, symbolic).

symbolic instruction, see (instruction, symbolic).

symbolic logic, see (logic, symbolic).

symbolic notation, see (notation, symbolic).

symbolic number, see (number, symbolic).

symbolic programing, see (programing, symbolic).

synchronizer, a storage device used to compensate for a difference in a rate of flow of information or time of occurrence of events when transmitting information from one device to another.

synchronous computer, see (computer, synchronous).

syntax, the rules governing sentence structure in a language, or statement structure in a language such as that of a compiler.

synthesis, the combining of parts in order to form a whole; e.g., to arrive at a circuit or a computer or program, starting from performance requirements. This can be contrasted with analysis, which arrives at performance, given the circuit or program.

synthetic relationship, see (relationship, synthetic).

system, an assembly of procedures, processes, methods, routines or techniques united by some form of regulated interaction to form an organized whole.

system, addressing, the procedure used to label storage locations in a computer; e.g., on a magnetic storage drum, storage locations might be identified by four digit addresses which are numbered consecutively in each band as follows:

First band	0000 - 0199
Second band	0200 - 0399
Third band	0400 - 0599
* * * * *	
Twenty-fourth band	4600 - 4799
Twenty-fifth band	4800 - 4999

The consecutively numbered band addresses begin with 0000, to which increments of 200 are added until the address of the last band, 4800 is reached. Within each band, particular locations might be consecutively numbered from 0 to 199 to give each location an address indicative of a position on the drum or drum level. This level is added to the band address to produce the address of a particular storage location. In a magnetic core storage unit, the locations might be addressed consecutively from 0000 to 4,095.

system analysis, synonymous with (analysis, system).

system, automatic data processing, the term descriptive of an interacting assembly of procedures, processes, methods, personnel and automatic data processing equipment to perform a complex series of data processing operations.

system, batten, same as (system, peek-a-boo).

system, binary number, same as (system, number (2)).

system check, see (check, system).

system, cordonnier, same as (system, peek-a-boo).

system, data processing machine, an assembly of data processing machines united by some form of regulated interaction to form an organized whole.

system, decimal numbering, a system of reckoning by 10 or the powers of 10 using the digits 0 - 9 to express numerical quantities.

system, electronic data processing, the general term used to define a system for data processing by means of machines utilizing electronic circuitry at electronic speed, as opposed to electromechanical equipment.

system, exception principle, an information system or data processing system which reports on situations only when actual results differ from planned results. When results occur within a normal range they are not reported.

system, executive, same as (system, operating).

system, Filmorex, a system for the electronic selection of microfilm cards devised by Jacques Samain. Each card has a micro reproduction of the document or abstract and a field of twenty 5-digit code numbers giving the bibliographic reference and the subjects treated.

system, horizontal, a programing system in which instructions are written horizontally; i.e., across the page.

system improvement time, see (time, system improvement).

system, information, the network of all communication methods within an organization. Information may be derived from many sources other than a data processing unit, such as by telephone, by contact with other people, or by studying an operation.

system, information retrieval, a system for locating and selecting, on demand, certain documents, or other graphic records relevant to a given information requirement from a file of such material. Examples of information retrieval systems are classification, indexing, and machine searching systems.

system, management information, a communications process in which data are recorded and processed for operational purposes. The problems are isolated for higher level decision making and information is fed back to top management to reflect the progress or lack of progress made in achieving major objectives.

system, monitor, same as (system, operating).

system, number, (1) a systematic method for representing numerical quantities in which any quantity is represented as the sequence of coefficients of the successive powers of a particular base with an appropriate point. Each succeeding coefficient from right to left is associated with and usually multiplies the

next higher power of the base. The first coefficient to the left of the point is associated with the zero power of the base. For example, in decimal notation 371.426 represents $(3\times10^{2})+(7\times10^{1})+(1\times10^{0})+(4\times10^{-1})+(2\times10^{-2})+(6\times10^{-3})$. (2) The following are names of the number systems with bases 2 through 20: 2, Binary; 3, Ternary; 4, Quaternary; 5, Quinary; 6, Senary; 7, Septenary; 8, Octal, or octonary; 9, Novenary; 10, Decimal; 11, Undecimal; 12, Duodecimal; 13, Terdenary; 14, Quaterdenary; 15, Quindenary; 16, Sexadecimal, or Hexadecimal; 17, Septendecimal; 18, Octodenary; 19, Novemdenary; 20, Vicenary. Also 32, Duosexadecimal, or duotricinary; and 60, Sexagenary. The Binary, Octal, Decimal, and Sexadecimal systems are widely used in computers. Synonymous with (duodecimal number) and (binary number system) and related to (representation, positional) and clarified by (digit, octal and binary).

system, operating, an integrated collection of service routines for supervising the sequencing of programs by a computer. Operating systems may perform debugging, input-output, accounting, compilation, and storage assignment tasks. Synonymous with (monitor system) and (executive system).

system, peek-a-boo, an information retrieval system which uses peek-a-boo cards; i.e., cards into which small holes are drilled at the intersections of coordinates (column and row designations) to represent document numbers. Synonymous with (batten system) and (cordonnier system) and related to (card, aspect).

system, real time, same as (processing, real time).

system, uniterm, an information retrieval system which uses uniterm cards. Cards representing words of interest in a search are selected and compared visually. If identical numbers are found to appear on the uniterm card undergoing comparison these numbers represent documents to be examined in connection with the search. Related to (card, aspect) and (indexing, uniterm).

systems analysis, see (analysis, systems).

systems test, see (test, systems).

T

table, a collection of data in a form suitable for ready reference, frequently as stored in sequenced machine locations or written in the form of an array of rows and columns for easy entry and in which an intersection of labeled rows and columns serves to locate a specific piece of data or information.

table, function, (1) the two or more sets of information so arranged that an entry in one set selects one or more entries in the remaining sets; (2) a dictionary; (3) a device constructed of hardware, or a subroutine, which can either decode multiple inputs into a single output or encode a single input into multiple outputs; (4) a tabulation of the values of a function for a set of values of the variable.

table look up, to obtain a function value corresponding to an argument, stated or implied, from a table of function values stored in the computer. Also, the operation of obtaining a value from a table. Synonymous with (TLU).

table, truth, a representation of a switching function, or truth function, in which every possible configuration of argument values 0, 1 or true-false is listed, and beside each is given the associated function value 0-1 or true-false. The number of configurations is 2^{N}, where N is the number of arguments, unless the function is incompletely specified; i.e., Don't Care conditions. An example of a truth table for the AND-Function and the OR-Function (Inclusive) is:

VARIABLE		AND	OR
A	B	AB	A+B
0	0	0	0
0	1	0	1
1	0	0	1
1	1	1	1

tabulating equipment, see (equipment, tabulating).

tabulator, a machine which reads information from one medium; e.g., cards, paper tape, and magnetic tape and produces lists, tables, and totals on separate forms or continuous paper. Synonymous with (machine, accounting), and clarified by (equipment, tabulating).

tag, a unit of information, whose composition differs from that of other members of the set so that it can be used as a marker or label. A tag bit is an instruction word that is also called a sentinel.

takedown, the actions performed at the end of an equipment operating cycle to prepare the equipment for the next setup; e.g., to remove the tapes from the tape handlers at the end of a computer run is a takedown operation.

takedown time, see (time, take down).

tank, (1) a container usually filled with mercury, and provided with a set of transducers for use as a delay line channel or set of channels, each forming a separate recirculation path for the storage of data; (2) a circuit consisting of inductance and capacitance used for the purpose of sustaining electrical oscillations.

tank, mercury, a container used to hold mercury.

tape, a strip of material, which may be punched, coated, or impregnated with magnetic or optically sensitive substances, and used for data input, storage or output. The data are stored serially in several channels across the tape tranversely to the reading or writing motion.

tape-limited, the description of a section of a program in which the time required, on buffered computers, to read or write tapes exceeds the time required for computation.

tape, chadded paper, a paper tape with the holes fully punched.

tape, chadless paper, a paper tape with the holes partially punched. It is commonly used in teletype operations.

tape, change, a paper tape or magnetic tape carrying information that is to be used to update filed information. This filed information is often on a master tape. Synonymous with (transaction tape).

tape drive, same as (transport, tape).
tape feed, see (feed, tape).
tape-limited, a section of routine on buffered computers in which the time required to read and write tapes exceeds the time required for computation.
tape, magnetic, a tape or ribbon of any material impregnated or coated with magnetic or other material on which information may be placed in the form of magnetically polarized spots.
tape mark, see (mark, tape).
tape, master instruction, a tape on which all the programs for a system of runs are recorded. Synonymous with (MIT).
tape, paper, a strip of paper capable of storing or recording information. Storage may be in the form of punched holes, partially punched holes, carbonization or chemical change of impregnated material, or by imprinting. Some paper tapes, such as punched paper tapes, are capable of being read by the input device of a computer or a transmitting device by sensing the pattern of holes which represent coded information.
tape, perforated, same as (tape, punch).
tape, program, a tape which contains the sequence of instructions required for solving a problem and which is read into a computer prior to running a program.
tape, punch, a tape, usually paper, upon which data may be stored in the form of punched holes. Hole locations are arranged in columns across the width of the tape. There are usually 5 to 8 positions, channels, per column, with data represented by a binary coded decimal system. All holes in a column are sensed simultaneously in a manner similar to that for punch cards. Synonymous with (perforated tape).
tape skip, see (skip, tape).
tape to card converter, see (converter, tape to card).
tape, transaction, same as (tape, change).
tape transport, see (transport, tape).
tape unit, see (unit, tape).
target language, see (language, target).
target program, same as (program, object).
telemetering, the transmission of a measurement over long distances, usually by electromagnetic means.
temporary storage, see (storage, working).
teracycle, a mega megacycle per second, 10^{12} cycles per second.
terminal digit posting, see (posting, terminal digit).
terminating symbol, see (symbol, terminating).
ternary, pertaining to a system of notation utilizing the base of 3.
test, crippled leapfrog, a variation of the leapfrog test, modified so that it repeats its tests from a single set of storage locations rather than a changing set of locations. Related to (test, leapfrog).
test data, see (data, test).
test, diagnostic, the running of a machine program or routine for the purpose of discovering a failure or a potential failure of a machine element, and to determine its location or its potential location.
test, high-low bias, same as (check, marginal).
test, leapfrog, a program designed to discover computer malfunction, characterized by the property that it performs a series of arithmetical or logical operations on one group of storage locations, transfers itself to another group of storage locations, checks the correctness of the transfer, then begins the series of operations again. Eventually, all storage positions will have been occupied and the test will be repeated. Related to (test, crippled leapfrog).
test, marginal, same as (check, marginal).
test, program, a system of checking before running any problem in which a sample problem of the same type with a known answer is run.
test routine, see (routine, test).
test, systems, (1) the running of the whole system against test data, (2) a complete simulation of the actual running system for purposes of testing out the adequacy of the system, (3) a test of an entire interconnected set of components for the purpose of determining proper functioning and interconnection.
test, volume, the processing of a volume of actual data to check for program malfunctions.
tetrad, a group of four; e.g., four pulses; used to express a decimal digit.
theory, game, a mathematical process of selecting an optimum strategy in the face of an opponent who has a strategy of his own.
theory, information, the mathematical theory concerned with information rate, channels, channel width, noise and other factors affecting information transmission. Initially developed for electrical communications, it is now applied to business systems, and other phenomena which deal with information units and flow of information in networks.
theory, queuing, a form of probability theory useful in studying delays or line-ups at servicing points.
theory, probability, a measure of likelihood of occurrence of a chance event, used to predict behaviour of a group, not of a single item in the group.
three address, see (address, three).
three plus one address, see (address, three plus one).
three plus one address instruction, same as (instruction, four address).
time, acceleration, the time between the interpretation of instructions to read or write on tape and the transfer of information to or from the tape into storage, or from storage into tape, as the case may be. Synonymous with (start time).
time, access, (1) the time it takes a computer to locate data or an instruction word in its storage section and transfer it to its arithmetic unit where the required computations are performed. (2) The time it takes to transfer information which has been operated on from the arithmetic unit to the location in storage where the information is to be stored. Synonymous with (read time); (real time) and related to (time, write) and (time, word (2)).
time, add subtract, the time required to perform an addition or subtraction, exclusive of the time required to obtain the quantities from

storage and put the sum or difference back into storage.

time, available, (1) the number of hours a computer is available for use. (2) The time during which a computer has the power turned on, is not under maintenance, and is known or believed to be operating correctly. Synonymous with (available machine time).

time, available machine, same as (time, available (2)).

time, carry, (1) the time required for transferring a carry digit to the higher column and there adding it, (2) the time required for transferring all the carry digits to higher columns and adding them for all digits in the number.

time, code checking, the time spent checking out a problem on the machine making sure that the problem is set up correctly, and that the code is correct.

time, dead, any definite delay deliberately placed between two related actions in order to avoid overlap that might cause confusion or to permit a particular different event such as a control decision, switching event or similar action to take place.

time, decay, the time in which a voltage or current pulse will decrease to one-tenth of its maximum value. Decay time is proportional to the time constant of the circuit.

time, deceleration, the time which elapses between completion of reading or writing of a tape record and the time when the tape stops moving. Synonymous with (time, stop).

time, down, the period during which a computer is malfunctioning or not operating correctly due to mechanical or electronic failure, as opposed to available time, idle time, or stand-by time, during which the computer is functional. Contrasted with (time, up).

time, engineering, the total machine down time necessary for routine testing, good or bad, for machine servicing due to breakdowns, or for preventive servicing measures; e.g., block tube changes. This includes all test time, good or bad, following breakdown and subsequent repair or preventive servicing. Synonymous with (servicing time).

time, execution, the portion of an instruction cycle during which the actual work is performed or operation executed; i.e., the time required to decode and perform an instruction. Synonymous with (time, instruction (2)).

time, idle, (1) the period between the end of one programed computer run and the commencement of a subsequent programed run; (2) the time normally used to assemble cards, paper, tape reels, and control panels required for the next computer operation; (3) the time between operations when no work is scheduled.

time, instruction, (1) the portion of an instruction cycle during which the control unit is analyzing the instruction and setting up to perform the indicated operation; (2) same as (time, execution).

time, latency, (1) the time lag between completion of instruction staticizing and the initiation of the movement of data from its storage location, (2) the rotational delay time from a disc file or a drum file.

time, multiplication, the time required to perform a multiplication. For a binary number it will be equal to the total of all the addition times and all the shift time involved in the multiplication.

time, no charge machine fault, the unproductive time due to computer fault such as the following: nonduplication, transcribing error, input-output malfunction and machine malfunction resulting in an incomplete run.

time, no charge non machine fault, the unproductive time due to no fault of the computer such as the following: good duplication, error in preparation of input data, error in arranging the program deck, error in operating instructions or misinterpretation of instructions, and unscheduled good testing time, and a run during a normal production period when machine malfunction is suspected but is demonstrated not to exist.

time, non scheduled maintenance, the elapsed time during scheduled working hours between the determination of a machine failure and placement of the equipment back into operation.

time, operation use, in Federal Government ADP contracts the time during which the equipment is in operation, exclusive of idle time, standby time, maintenance time, or rerun time due to machine failure. Components not programed for use in a specific computer run are not considered to be in use even though connected into the computer system.

time, program testing, the machine time expended for program testing, debugging, and volume and compatibility testing.

time-pulse distributor, see (distributor, time-pulse).

time, read, same as (time, access).

time, real, same as (time, access). Clarified by (processing, real time) and (operation, real time).

time, reference, an instant near the beginning of switching chosen as an origin for time measurements. It is variously taken as the first instant at which the instantaneous value of the drive pulse, the voltage response of the magnetic cell, or the integrated voltage response reaches a specified fraction of its peak pulse amplitude.

time, reimbursed, the machine time which is loaned or rented to another office, agency or organization either on a reimbursable or reciprocal basis.

time, representative calculating, a method of evaluating the speed performance of a computer. One method is to use one-tenth of the time required to perform nine complete additions and one complete multiplication. A complete addition or a complete multiplication time includes the time required to procure two operands from high-speed storage, perform the operation, and store the result and the time required to select and execute the required number of instructions to do this.

time, rise, the time required for the leading edge of a pulse to rise from one-tenth of its final value to nine-tenths of its final value. Rise time is proportional to the time constant of the circuit.

time, search, the time required to locate a particular field of data in storage. Searching

requires a comparison of each field with a predetermined standard until an identity is obtained. This is contrasted with access time which is based upon locating data by means of the address of its storage location.

time series, see (series, time).

time, servicing, same as (time, engineering).

time, set up, the portion of the elapsed time between machine operations which is devoted to such tasks as changing reels of tape, and moving cards, tapes, and supplies to and from the equipment.

time-sharing, the use of a device for two or more purposes during the same overall time interval, accomplished by interspersing component actions in time.

time, standby, (1) the elapsed time between inquiries when the equipment is operating on an inquiry application, (2) the time during which two or more computers tied together and available to answer inquiries or process intermittent actions on stored data.

time, standby unattended, the time in which the machine is in an unknown condition and not in use working on problems. This includes time in which the machine is known to be defective and work is not being done to restore it to operating condition. It also includes breakdowns which render it unavailable due to outside conditions such as power shortages.

time, start, same as (time, acceleration).

time, stop, same as (time, deceleration).

time, switching, (1) the time interval between the reference-time, or time at which the leading edge of switching or driving pulse occurs, and the last instant at which the instantaneous voltage response of a magnetic cell reaches a stated fraction of its peak value; (2) the time interval between the reference time and the first instant at which the instantaneous integrated voltage response reaches a stated fraction of its peak value.

time, system improvement, the machine down time needed for the installation and testing of new components, large or small, and machine down time necessary for modification of existing components. This includes all programed tests following the above actions to prove the machine is operating properly.

time, takedown, the time required to take down a piece of equipment.

time, training, the machine time expended in training employees in the use of the equipment including such activities as mounting, console operation, converter operation, printing operation and related activities and time spent in conducting required demonstrations.

time, turn around, the time required to reverse the direction of transmission in a communication channel.

time, up, the time during which equipment is either producing work or is available for productive work. Contrasted with (time, down).

time, word, (1) the amount of time required to move one word past a given point. The term is used especially in reference to words stored serially. (2) The time required to transport one word from one storage device to another. Related to (time, access).

time, write, the amount of time it takes to record information. Related to (time, access).

TLU, Table Look Up, see (table look up).

toggle, (1) a flip-flop. (2) Pertaining to a manually operated on-off switch; i.e., a two position switch. (2) Pertaining to a manually operated on-off switch; i.e., a two position switch. (3) Pertaining to flip-flop, see-saw, or bistable action.

toggle switch, see (switch, toggle).

token, a distinguishable unit in a sequence of characters.

total, batch, the sum of certain quantities, pertaining to batches of unit records, used to verify accuracy of operations on a particular batch of records; e.g., in a payroll calculation, the batches might be departments, and batch totals would be number of employees in the department, total hours worded in the department, total pay for the department. Batches, however, may be arbitrary, such as orders received from 9 a.m. to 11 a.m. on a certain day.

total, control, a sum of numbers in a specified record field of a batch of records, determined repetitiously, during the processing operation so that any discrepancy from the control indicates an error. A control total often has some significance in itself, but may not, as for example, when a control total is determined as the sum of identification numbers of records. Related to (total, hash).

total, hash, a sum of numbers in a specified field of a record or of a batch of records used for checking purposes. No attention is paid to the significance of the total. Examples of such numbers are customer numbers or part numbers. If alphabetic characters have a numerical interpretation to a computer, they also could be added. Related to (total, control).

trace, an interpretive diagnostic technique which provides an analysis of each executed instruction and writes it on an output device as each instruction is executed.

trace, selective, a tracing routine wherein only instructions satisfying certain specified criteria are subject to tracing. Typical criteria are: (a) Instruction type; e.g., arithmetic jump. (b) Instruction location; e.g., specific region. (c) Data location; e.g., specific region. For Case a, where tracing is performed on transfer, jump, instructions the term logical trace is sometimes used.

tracing routine, see (routine, tracing).

track, the path along which information is recorded on a storage device; e.g., the track on a drum or tape.

trailer record, see (record, trailer).

training time, see (time, training).

transaction data, see (data, transaction).

transaction tape, same as (tape, change).

transceiver, a device which transmits and receives data from punch card to punch card. It is essentially a conversion device which at the sending end reads the card and transmits the data over the wire. At the receiving end it punches the data into a card.

transcribe, to copy, with or without translating, from one storage medium to another.

transcriber, the equipment associated with a computing machine for the purpose of transferring input, or output, data from a record of information in a given language to the medium and the language used by a digital computing machine, or from a computing machine to a record of information.

transducer, a device which converts energy from one form to another; e.g., a quartz crystal imbedded in mercury can change electrical energy to sound energy as is done in sonic delay lines in computer storage systems.

transfer, (1) the conveyance of control from one mode to another by means of instructions or signals. (2) The conveyance of data from one place to another. (3) An instruction for transfer. (4) To copy, exchange, read, record, store, transmit, transport, or write data. (5) an instruction which provides the ability to break the normal sequential flow of control. Synonymous with (jump), and (control transfer).

transfer, block, the conveyance of a group of consecutive words from one place to another.

transfer card, same as (card, transition).

transfer check, see (check, transfer).

transfer, conditional, an instruction which, if a specified condition or set of conditions is satisfied, is interpreted as an unconditional transfer. If the condition is not satisfied, the instruction causes the computer to proceed in its normal sequence of control. A conditional transfer also includes the testing of the condition. Synonymous with (conditional jump) and (conditional branch) and related to (branch).

transfer control, same as (transfer (4)).

transfer function, see (function, transfer).

transfer instruction, same as (instruction, branch).

transfer of control card, same as (card, transition).

transfer operation, see (operation, transfer).

transfer, parallel, a method of data transfer in which the characters of an element of information are transferred simultaneously over a set of paths.

transfer, serial, a method of data transfer in which the characters of an element are transferred in sequence over a signal path in consecutive time positions.

transfer, unconditional, an instruction which switches the sequence of control to some specified location. Synonymous with (unconditional branch); (unconditional jump) and (unconditional transfer of control).

transfluxor, a magnetic core having two or more openings. Control of the magnetic flux in the various legs of the magnetic circuits and the binary magnetic characteristics of the material permits storage.

transform, to derive a new body of data from a given one according to specific procedures, often leaving some feature invariant. Related to (translate).

transient, (1) a physical disturbance, intermediate to two steady-state conditions. (2) Pertaining to rapid change. (3) A build-up or breakdown in the intensity of a phenomenon until a steady state condition is reached. The time rate of change of energy is finite and some form of energy storage is usually involved.

transistor, an electronic device utilizing semiconductor properties to control the flow of currents.

transition card, see (card, transition).

translate, to change information from one form of representation to another without significantly affecting the meaning. Related to (transform).

translating routine, same as (translator (1)).

translation, algorithm, a specific, effective, essentially computational method for obtaining a translation from one language to another.

translation, machine, the automatic translation from one representation to another representation. The translation may involve codes, languages, or other systems of representation. Related to (dictionary, automatic).

translation, mechanical, a generic term for language translation by computers or similar equipment.

translator, (1) a program whose input is a sequence of statements in some language and whose output is an equivalent sequence of statements in another language. Synonymous with (translating routine). (2) a translating device.

transliterate, to represent the characters or words of one language by corresponding characters or words of another language.

transmission, serial, to move data in sequence, one character at a time as contrasted with parallel transmission.

transmission speed, see (speed, transmission).

transmit, to reproduce information in a new location replacing whatever was previously stored.

transport, tape, the mechanism which moves magnetic or paper tape past sensing and recording heads and usually associated with data processing equipment. Synonymous with (tape transport), (tape drive), and (feed, tape); related to (unit, tape); (unit, magnetic tape); and (unit, paper tape).

trap, (1) a special form of a conditional breakpoint which is activated by the hardware itself, by conditions imposed by the operating system, or by a combination of the two. Traps are an outgrowth of the old idea of switch controlled halts or jumps. Frequently a number of internal triggers or traps exist in a computer. Since these are usually set only by unexpected or unpredictable occurrences and since the execution time and number of instructions for testing them can be burdensome, it is usual for these triggers to cause an automatic transfer of control, or jump to a known location, and to record in other standard locations the location from which the transfer occurred, and the cause of the transfer. Some trapping features can also be enabled or inhibited under program control; e.g., an overflow trap. Related to (routine, tracing). (2) A routine to determine indirectly the setting of internal triggers in the computer.

trapping, a feature of some computers whereby an unscheduled; i.e., nonprogramed, jump is made to a predetermined location in response to a machine condition; e.g., a tagged instruction, or a anomalous arithmetic situation. Such a feature is commonly used by monitor routines to provide automatic checking or for communication between input-output routines and the programs using them.

triad, a group of three bits or three pulses, usually in sequence on one wire or simultaneously on three wires.

trigger, Eccles-Jordan, same as (flip-flop).

triple precision, see (precision, triple).

trouble location problem, see (problem, trouble location).

trouble-shoot, to search for the cause of a malfunction or erroneous program behavior, in order to remove the malfunction.

truncate, to drop digits of a number of terms of a series thus lessening precision; e.g., the number 3.14159265 is truncated to five figures in 3.1415, whereas one may round off to 3.1416.

truncation error, see (error, truncation).

trunk, same as (bus (1)).

truth table, see (table, truth).

tube, cathode ray, (1) an electronic vacuum tube containing a screen on which information may be stored by means of a multigrid modulated beam of electrons from the thermionic emitter storage effected by means of charged or uncharged spots, (2) a storage tube, (3) an oscilloscope tube, (4) a picture tube.

tube, display, a cathode ray tube used to display information.

tube, williams, a cathode ray tube used as an electrostatic storage device and of the type designed by F. C. Williams, University of Manchester, England. Synonymous with (williams tube storage).

turing machine, see (machine, turing).

turn around time, see (time, turn around).

twelve punch (12-punch), same as (punch, Y (2)).

twin check, see (check, twin).

two-out-of-five code, see (code, two-out-of-five).

two state variable, same as (variable, two-valued).

two, three or four address instruction, see (instruction, two, three or four address).

two-valued variable, see (variable, two-valued).

two-wire circuit, see (circuit, two-wire).

U

underpunch, a punch in one of the lower rows, 1-9, of an 80-column 12-row punch card.

ultrasonics, the field of science devoted to frequencies of sound above the human audio range; i.e., above 20 kilocycles per second.

unconditional branch, same as (transfer, unconditional).

unconditional jump, same as (transfer, unconditional).

unconditional transfer, see (transfer, unconditional).

unconditional transfer of control, same as (transfer, unconditional).

underflow, (1) the condition which arises when a machine computation yields a result which is smaller than the smallest possible quantity which the machine is capable of storing, (2) a condition in which the exponent plus the excess becomes negative in a floating point arithmetic operation.

unit, a portion or subassembly of a computer which constitutes the means of accomplishing some inclusive operation or function.

unit, arithmetic, the portion of the hardware of a computer in which arithmetic and logical operations are performed. The arithmetic unit generally consists of an accumulator, some special registers for the storage of operands and results supplemented by shifting and sequencing circuitry for implementing multiplication, division, and other desired operations. Synonymous with ALU.

unit, assembly, (1) a device which performs the function of associating and joining several parts or piecing together a program, (2) a portion of a program which is capable of being assembled into a larger whole program.

unit, card punch, same as (punch, card).

unit, card reader, same as (reader, card (2)).

unit, central processing, same as (frame, main (1)).

unit, control, the portion of a computer which directs the sequence of operations, interprets the coded instructions, and initiates the proper commands to the computer circuits preparatory to execution.

unit, magnetic tape, the mechanism, normally used with a computer, which handles magnetic tape and usually consists of a tape transport, reading or sensing and writing or recording heads, and associated electrical and electronic equipments. Most units may provide for tape to be wound and stored on reels; however, some units provide for the tape to be stored loosely in closed bins. Clarified by (transport, tape), and (unit, paper tape).

unit, paper tape, the mechanism which handles punched paper tape and usually consists of a paper tape transport, sensing and recording or perforating heads and associated electrical and electronic equipments. Clarified by (transport, tape), and (unit, magnetic tape).

unit, read punch, an input-output unit of a computing system which punches computed results into cards, reads input information into the system, and segregates output cards. The read-punch unit generally consists of a card feed, a read station, a punch station, another read station, and two output card stackers.

unit record, see (record, unit).

unit, tape, a device consisting of a tape transport, controls, a set of reels and a length of tape which is capable of recording and reading information on and from the tape, at the request of the computer under the influence of a program. Clarified by (transport, tape); (unit, magnetic tape); and (unit, paper tape).

uniterm, a word, symbol, or number used as a descriptor for retrieval of information from a collection; especially, such a descriptor used in a coordinate indexing system. Related

to (card, aspect); (descriptor); (indexing, coordinate); (docuterm).

uniterm indexing, see (indexing, uniterm).

uniterm system, see (system, uniterm).

uniterming, the selection of words, considered to be important and descriptive of the contents of a paper for later retrieval of the articles, reports, or other documents. The selected words are then included in a uniterm index.

universal turing machine, see (machine, universal turing).

unpack, to separate various sections of a tape record or computer word, and store them in separate locations. The sections usually correspond to format fields within the record or word. Related to (extract (2)).

unwind, to code explicitly, at length and in full all the operations of a cycle thus eliminating all redtape operations in the final problem coding. Unwinding may be performed automatically by the computer during assembly, generation, or compilation of a program.

update, (1) to put into a master file changes required by current information or transactions, (2) to modify an instruction so that the address numbers it contains are increased by a stated amount each time the instruction is performed.

up time, see (time, up).

utility program, same as (routine, utility).

utility routine, see (routine, utility).

V

validity, the correctness; especially the degree of the closeness by which iterated results approach the correct result.

validity check, see (check, validity).

variable, (1) a quantity which can assume any of the numbers of some set of numbers, (2) a condition, transaction or event which changes or may be changed as a result of processing additional data thru the system.

variable address, same as (address, indexed).

variable, binary, same as (variable, two valued).

variable connector, see (connector, variable).

variable cycle operation, see (operation, variable cycle).

variable, manipulated, in a process that is desired to regulate some condition, a quantity or a condition that is altered by the computer in order to initiate a change in the value of the regulated condition.

variable, two state, same as (variable, two valued).

variable, two valued, a variable which assumes values in a set containing exactly two elements, often symbolized as 0 and 1. This is often confused with double value variable; e.g., y =+vx. Synonymous with (binary variable) and (two state variable).

variable word-length, see (word-length, variable).

vector, a quantity having magnitude and direction, as contrasted with a scalar which has quantity only.

venn diagram, see (diagram, venn).

verifier, a device on which a record can be compared or tested for identity character-by-character with a retranscription or copy as it is being prepared.

verify, to check a transcribing operation, by a compare operation. It usually applies to transcriptions which can be read mechanically or electrically.

vocabulary, a list of operating codes or instructions available to the programer for writing the program for a given problem for a specific computer.

vocabulary, sophisticated, an advanced and elaborate set of instructions. Some computers can perform only the more common mathematical calculations such as addition, multiplication, and subtraction. A computer with a sophisticated vocabulary can go beyond this and perform operations such as linearize, extract square root, and select highest number.

volatile storage, see (storage, volatile).

volume test, see (test, volume).

W

waste instruction, same as (instruction, no-op (4)).

wave, carrier, the basic frequency or pulse repetition rate of a signal, bearing no intrinsic intelligence until it is modulated by another signal which does bear intelligence. A carrier may be amplitude, phase, or frequency modulated; e.g., in a typical mercury delay line storage of a digital computer, the 8 megacycle/second sound wave carrier is amplitude or pulse-modulated by a 1 megacycle/second pulse code signal, the presence or absence of a pulse determining whether or not a one or a zero is present in the binary number being represented.

williams tube, see (tube, williams).

williams tube storage, same as (tube, williams).

wire, magnetic, a wire made of or coated with a magnetic material and used for magnetic recording.

wire printer, see (printer, wire).

wired program computer, see (computer, wired program).

word, an ordered set of characters which occupies one storage location and is treated by the computer circuits as a unit and transferred as such. Ordinarily a word is treated by the control unit as an instruction, and by the arithmetic unit as a quantity. Word lengths may be fixed or variable depending on the particular computer.

word, control, a word, usually the first or last of a record, or first or last word of a block, which carries indicative information for the following words, records, or blocks.

word, data, a word which may be primarily regarded as part of the information manipulated by a given program. A data word may be used to modify a program instruction, or to be arithmetically combined with other data words.

word, duoprimed, a computer word containing a representation of the 6, 7, 8, and 9 rows of information from an 80-column card.

word index, see (index, word).

word, information, an ordered set of characters bearing at least one meaning and handled by

a computer as a unit, including separating and spacing, which may be contrasted with instruction words. Related to (word, machine).

word length, see (length, word).

word-length, fixed, having the property that a machine word always contains the same number of characters or digits.

word-length, variable, having the property that a machine word may have a variable number of characters. It may be applied either to a single entry whose information content may be changed from time to time, or to a group of functionally similar entries whose corresponding components are of different lengths.

word, machine, a unit of information of a standard number of characters which a machine regularly handles in each transfer; e.g., a machine may regularly handle numbers or instruction in units of 36 binary digits; this is then the machine word. Related to (word, information).

word-mark, an indicator to signal the beginning or end of a word.

word, short, the fixed word of lesser length in computers capable of handling words of two different lengths. In many computers this is referred to as a half-word because the length is exactly the half-length of the full word.

word time, see (time, word).

working space, same as (storage, working).

working storage, see (storage, working).

write, (1) to transfer information, usually from main storage, to an output device; (2) to record data in a register, location, or other storage device or medium.

X, Y, Z

X punch, see (punch, X).

xerographic printer, see (printer, xerographic).

xerography, a dry copying process involving the photo electric discharge of an electrostatically charged plate. The copy is made by tumbling a resinous powder over the plate, the remaining electrostatic charge discharged and the resin transferred to paper or an offset printing master.

XY plotter, see (plotter, XY).

Y punch, see (punch, Y).

zero, a numeral normally denoting lack of magnitude. In many computers there are distinct representations for plus and minus zero.

zero access storage, see (storage, zero access).

zero address instruction, see (instruction, zero address).

zero level address, same as (address, immediate).

zero suppression, see (suppression, zero).

zone, (1) a portion of internal storage allocated for a particular function or purpose. (2) The three top positions of 12, 11 and 0 on certain punch cards. In these positions, a second punch can be inserted so that with punches in the remaining positions 1 to 9, alphabetic characters may be represented.

zone bit, see (bit, zone).

zone, dead, same as (band, dead).

zone, neutral, an area in space or an interval of time in which a state of being other than the implementing state exists; e.g., a range of values in which no control action occurs or a brief period between words when certain switching action takes place. Similar to (band, dead).

zone punch, same as (overpunch).

zone, minus, the bit positions in a computer code which represent the algebraic minus sign.

zone, plus, the bit positions in a computer code which represent the algebraic plus sign.